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ABSTRACT

Our nation is becoming increasingly aware of the rising costs of medical care and the rising costs of the education of health workers. This report presents 7 case studies that review procedures followed by colleges or educational program directors in costing individual allied health occupation programs. The research was performed by the Cost Advisory Group of the Executive Committee of the Association of Schools of Allied Health Professions. The results of the explorations proved disappointing due to time limitations and a lack of resources. It was found, however, that the total expenditures for allied health educational programs at an academic institution depend on 2 factors: (1) the expenditures for particular curricula; and (2) the combination of curricula at that institution. The problems associated with cost analysis are many, but they are not insoluble. They should be regarded as a challenge and voluntarily accepted as such. Because of the degree of expertise and involvement that are needed, it is recommended that cost study groups be established to work exclusively on this problem. (Author/HS)

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COST ANALYSIS IN HIGHER EDUCATION: A REVIEW WITH RECOMMENDATIONS FOR ALLIED HEALTH EDUCATIONAL PROGRAMS

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Section I

SUMMARY REPORT

Section I
Summary Report

INTRODUCTION

The Association of Schools of Allied Health Professions (ASAHP), as its final report under Contract #70-4051 with the National Institutes of Health (NIH), is required to submit a report on determining costs of allied health education programs. Specifically, ASAHP is directed to do the following:

> "Review practices followed in determining the costs of educational programs and prepare recommendations for this which are specifically applicable to allied health occupations programs.
>
> a. Review costing procedures recommended or followed by major Federal and non-Federal official and voluntary organizations, including procedures applicable to medical, dental, and nursing education.
>
> b. Review procedures followed by colleges or educational programs directors in costing individual allied health occupations programs.
>
> "Recommend one or more sets of institutional costing procedures to be followed, applicable to allied health occupations academic programs at sub-baccalaureate levels in order to develop costs of the professional or technical component of such programs, including practicum training, teaching, administration, faculty development, and general operations."

The contractual responsibility was discussed at a meeting of the Executive Committee of the Association of Schools of Allied Health Professions on June 8, 1970. At that time it was agreed that the seven members of the Executive Committee would act as the Cost Advisory Group. Each member of the Cost Advisory Group was asked to organize a team at his institution to explore procedures for conducting a cost analysis of allied health education programs. Each team was to consist of two persons: the dean or someone with an in-depth knowledge of the allied health academic programs, and a fiscal person with an intimate knowledge of the institution's accounting system. The participating schools were asked to use actual expenditures and to arrive at an illustrative cost estimate, although the information did not need to be for the current year. No new methods or accounting systems were to be developed. The primary purpose was to identify problems which would present themselves if an actual cost study were to be initiated at a school of allied health.

At the meeting on June 8, members of the Cost Advisory Group were given a statement of the problem and were provided with examples of cost centers from other studies in the health field. Those included studies of costs of physician education, nursing education

and dental education, and a bibliography which was abstracted from one provided by the National Library of Medicine. The items which were provided to members of the Cost Advisory Group are listed in Section II of this report. Brief reviews of other studies of educational programs relating to health are included in Section III, and the complete bibliography provided by the National Library of Medicine appears in Section IV. Each of the members of the Cost Advisory Group was requested to submit a report by September 1. This date was established to permit preparation of a summary report at Association headquarters.

The results of the explorations of the Cost Advisory Group proved disappointing. The members of the Group found their charge impossible to accomplish within the limitations of time and resources which were available to them. Without exception, they reported a sense of frustration at the effort required to conduct a cost analysis. Despite their independent efforts, it became obvious by November 1 that relatively little information would be forthcoming. By that time, fall classes had started and studies of cost analysis had to be put aside. On the whole, the information which was submitted to the Association was variable, incomplete and not in the form requested at the outset. Despite their shortcomings, the results of the efforts of the Cost Advisory Group have been summarized and are included in this report as Case Studies A through G (Section II). The case studies are identified by letter in accordance with an agreement to preserve anonymity.

A review of other studies in cost analyses highlights the unrealistic nature of the charge as it was stated in the contract. A development study of estimating the cost of medical education at the Yale-New Haven Hospital began in 1963 and was published in 1969 - an interval of six years (1). Another study of seven medical centers required budgeting for a full-time person at each medical center to work with the study director (2). Although <u>each</u> of the seven medical centers was funded to the extent of $14,000 for the project, this amount did not cover the entire cost of the undertaking. The estimated cost for the studies averaged $30,000 per medical center.

Many of the problems which were encountered in the cost studies of medical education at medical centers are present in determining costs of allied health education as well. In fact, in some (but not all) instances, allied health education is conducted at medical centers, and at such centers, cost analyses for allied health education could be expected to approach the complexities of cost analyses for medical education. A fundamental problem regardless of who attempts to do such analyses is the fact that the basic fiscal information is not consistent in all institutions, and is usually unavailable in the form necessary to conduct such analyses. As a result, any cost analyses which are undertaken require a great deal

of estimation, rearrangement and manipulation of data to arrive at very crude figures.

In the course of discussion with members of the Cost Advisory Group during the summer, it was brought to our attention that, upon the initiative of one of its Vice-Presidents, one of the institutions represented in the Group invited a number of medical centers to c .culate costs for their own allied health programs. In contrast to the approach of the ASAHP effort which was first to the head of the allied health program, the approach in this other study was first to fiscal officers of the institutions. This effort was initiated in the Spring of 1970 is not yet complete because it is also having problems in securing the basic information needed to complete cost analyses.

In summary, it must be concluded that the task which was delineated for the ASAHP in the contract was not feasible within the time framework and the personnel and other resources which were made available. Therefore, this report is limited to a statement of the basic concepts used in other studies, a summary of the institutions which were represented in the ASAHP Cost Advisory Group, and some of the problems brought to our attention. We are not in a position to make more than a few definitive recommendations regarding procedures to be followed in determining the costs of the professional and technical components of allied health and educational programs.

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BASIC CONCEPTS OF COST ANALYSIS

The decade of the 1960's has made the citizens of the United States more aware than ever of the costs of medical care. Phenomenal increases are referred to almost daily. Hospital costs and the costs of physicians' services are both increasing at a rapid rate, although the former is increasing more rapidly than the latter.

Accompanying the pattern of increasing costs is the concomitant phenomenon of shortages of health personnel. Physicians, dentists, and nurses have been generally found to be in short supply. Rural areas, particularly, are short of personnel to render health services. More recently, there has once again been increasing attention to the possibility of a national health insurance system. Several bills have been introduced in Congress, and if any one of them is enacted the demand for health services is expected to increase. Such increased demands would exacerbate existing personnel shortages. The allied health movement is an attempt to develop auxiliary workers who will augment the efforts of the primary health professionals to meet the health needs of the nation.

Costs of health-related education have been increasing in tandem with costs of medical care, and the costs of medical, dental, and nursing education are in the forefront. Millett attributes the high costs to low student/faculty ratios, the need for extensive clinical facilities, and the failure of research and hospital patients to bear the full share of their own costs (3). Determining the costs of health-related education has been a challenging problem. The complex interrelationships between the medical, dental, or nursing school, the University and the hospital have made this a particularly difficult area of investigation. Augustus J. Carroll, a pioneer in the field of cost analysis in medical education, devoted over ten years to the subject (1,4). Studies relating to the costs of education have also been undertaken in the fields of dental education (5) and nursing education (6-10).

At the present time, the cost of allied health educational programs is also attracting considerable interest. The cost of educating such students is assumed to be considerably below that of primary health professionals for two reasons: lower cost per student-year, and shorter periods of training. A quantitative knowledge of costs of allied health educational programs would be useful to both educational and health planners in considering the financing of new programs and expanding or curtailing existing programs.

The earlier efforts of investigators in medical, dental and nursing education provide useful starting points for the study of methods of cost analysis for the allied health field because all of these educational programs have certain elements in common. They often start with one or more years of training which may be undifferentiated from other science majors, a period of professionally-oriented academic education, and finally a period of practical training or experience to complete the educational program.

The focus of our concern in this report is the cost of allied health educational programs. In aiming towards this goal, we will rely on the methods of other investigators against the background of allied health educational programs. Such a review does not constitute a cost analysis, but can be used to point out problems anticipated in conducting cost analyses in allied health.

A number of terms have been applied to the process of analyzing expenditures in the health field. The American Hospital Association (11) has used the term "cost finding". In studies relating to medical education, Augustus J. Carroll has described the process as "cost estimating" (1), while Thomas Campbell refers to"cost allocation" (2). The term "cost analysis" has been used by the National League for Nursing (6-9) and the Tennessee Higher Education Commission (10). This term will be used in the present report in referring to the analysis of expenditures. Regardless of the term used, however, the objective remains the same: analyzing expenditures for a specified time interval (usually an academic fiscal year), by organizing post-facto fiscal data to produce meaningful cost relationships. This is not to be confused with "cost accounting" which consists of on-going formal cost accounting procedures usually found in industrial situations (1).

Purpose of Cost Analysis

The basic purpose of cost analysis is to determine the cost of some process. The reasons for determining such costs are numerous. Cost analysis may be performed to better understand the process, to compare the costs of a single process under various alternatives, or to compare the cost of one process with the costs of other processes.

Cost analysis has been extensively used in the industrial world to determine the cost of manufacturing products. Such information is essential for decision-making in competitive markets because the manufacturer must decide the price to set for his product. He also wants to consider whether alternate ways of producing the same product are as good or better, or whether alternate products may be preferable.

The concepts of cost analysis have extended themselves to areas other than the production of goods, such as the cost of services. Because of their increasing importance in the health and economics of our nation, health services and educational services have evolved as areas of interest for the conduct of cost analyses. While the profit motive is absent, there is still a need to study the costs of providing medical or educational services under various alternatives for fiscal planning and decision-making. Hospitals, for example, must establish charges for services, and can logically do so only after they determine the cost of providing those services (11).

The reasons for analyzing expenditures in educational institutions will vary from one situation to another. Officials at an institution may simply want to look at costs at a single point in time for the sake of general understanding. At another institution they may wish to establish a historical series of cost figures for trend information. Still other institutions may wish to intercompare their results with those of other similar institutions. Governmental bodies such as departments of health or education may wish to compare costs over time as well as between institutions or under varying conditions for purposes of fiscal planning. Before an educational institution embarks on a cost analysis, it is essential that the purpose of the undertaking be carefully formulated because the procedures which are developed will depend on the purpose of the analysis.

Scope of "Cost"

Fiscal Data: As in other fields, the conduct of cost analyses in education require a careful definition of the "cost" to be determined. It is necessary to specify "cost" to whom. For example, "cost" may represent the cost of education to the student, the cost of education to the institution's endowment funds, the cost of education to taxpayers if a tax-supported institution is involved, or the cost of education irrespective of the sources of financial support. For the purpose of this presentation, we will consider the determination of the cost of educating allied health students to be in terms of expenditures and to be without regard to the source of support.

Similarly, we must identify the unit to which the "cost" shall refer. For example, the cost may consist of an aggregate cost for a governmental unit, an educational institution, a department or a program, or a unit cost for a graduate, an enrollee, or a full-time-equivalent student. The NIH contract specifies that consideration be given to the "costs of allied health academic programs". Our purpose, therefore, will be to determine the aggregate cost of all allied health programs within academic institutions in order that they may be accumulated for larger units such as universities, states,

or the Federal Government.

Discipline and Degree Level: Allied health educational programs in senior colleges are made up of a mix of curricula of varying disciplines and degree levels. Probably the most common curriculum throughout the country is medical technology, followed by dietetics, X-ray technology, physical therapy, dental hygiene, occupational therapy, and medical record science. The exact ranking of the last few which are mentioned may not be precise. The cluster of curricula which is offered at an academic institution varies from one to another, and so will the total expenditures for the institution.

The NIH contract does not define "program" but in order to be meaningful it would appear essential that the data be specific for discipline and degree level. The cost of allied health educational programs will vary considerably according to these characteristics. In general, one would expect the costs of laboratory-related programs such as medical technology will be higher than those for medical record science, for example. Separate cost estimates should be derived for separate disciplines and at different degree levels, rather than for all allied health students who are undifferentiated as to the programs they are pursuing.

Professional or Technical Component: The NIH contract specifies that the "costs" shall be limited to the professional or technical component of the program which shall include costs for practicum training, teaching, administration, faculty development and general operations". The term "professional or technical component" is taken to include specialized courses, clinical training, and supervised field experience and other activities designed to prepare students for particular health occupations. Thus, by implication, general academic preparation such as the first two years of four-year programs should be excluded.

The exclusion of general academic preparation from the "costs" may cause considerable difficulties because of the varied length of allied health educational programs:

Program	Program Length (post high school)
Certified laboratory assisting	1 Year
Dental hygiene	May be offered at 2-year (A.S.) or 4-year (B.S.) levels
Histologic technique	1 year
Medical secretaryship	1 year

Program (cont.)	Program Length (post high school)
Medical technology	Generally 4 years in duration: 3 years of academic preparation and 1 year of clinical training
Occupational therapy	4 years of preparation required: 3 years of academic preparation and 1 year of clinical training.
Physical therapy	4 years of preparation required: may consist of 3 years of academic work and 1 year of clinical training, or 2 years of academic work and 2 years of clinical training
Physician assisting	Programs vary from 1 to 5 years
Radiologic technology	May be offered at 2-year and 4-year levels

In some instances, the isolation of the professional or technical component of an allied health educational program may be simplified because of the fractionation which exists in the educational program. For example, a medical technologist who graduates with a bachelor's degree, may have received his education in three locations. The student may not have decided on a professional goal at the time of entry into college. The first two years may be spent at a junior or senior college completing the basic academic requirements. During this time, the student may remain undifferentiated from other science majors who do not enter the allied health field. Since these two years represent general education, they should be excluded from the "costs". The third year may be devoted to completing the intensive scientific requirements at a senior college, and the fourth year to practical training and experience in the clinical laboratory of a hospital. These last two years represent the professional or technical component of the program, and, according to the NIH specifications, should be included in the "costs".

Because the portion of time devoted to general academic preparation varies with discipline, special procedures may be necessary to derive "costs" which relate only to the professional or technical component of programs. For example:

a. In academic institutions where students are accepted for professional programs such as medical technology or physical therapy in the freshman year, any expenditures for basic academic preparation must be excluded. This may require prorating faculty salaries if part of their time is spent in teaching courses which are considered basic academic preparation.

b. In academic institutions where students enter professional programs in their junior year, the third and fourth years will generally be considered a part of the professional or technical component of the programs.

c. In programs of lesser duration, the professional or technical part of the program will need to be identified for each individual program.

Time Period: Finally, it is necessary to specify the time interval to which the "costs" shall refer. Depending on one's purposes, the unit of choice may be a decade, a year, or in terms of the complete educational program of a typical student which may cover a period of several years. For present purposes, it is assumed that the "cost" to be derived will be for a 12-month period, and that the period should coincide with the academic fiscal year.

In summary, for the purposes of this presentation, the problem of cost of allied health education has been interpreted to mean the following. It should:

1. Include all expenditures irrespective of the source of funds (tuition, grants, endowment, etc.);

2. Refer separately to different disciplines (medical technology, medical record science, etc.) at different degree levels;

3. Include only the professional or technical component of the allied health educational programs; and

4. Refer to a full year (calendar, academic, or fiscal).

Development of Fiscal Information

As has been noted before, the nature of the information which is needed for cost analysis varies with the purpose for which the cost information is intended. For example, if the information is desired only for a single institution at a single point in time, the procedures for determining "costs" can be developed independently by that institution. If comparisons are to be made between costs over a period of years at a single institution, the procedure for determining the costs for the institution must be followed consistently from one year to another, but the method may still be developed by that institution for its own use. Greater difficulty is introduced if the purpose of performing cost analyses is to compare costs among a number of institutions. The difficulties are related to differences in administrative structures and to the differences in accounting systems at the institutions which are to be compared.

Basic to any cost analysis, whether for one academic institution or many, is the systematic categorization of the expenditures which are involved.

In industrial studies, the concepts of cost analysis have been used over a long period of time. With repeated trials, some industrial firms have constructed an interrelated accounting system whereby all purchases as well as sales are related to the products being produced, and the accounting practices are designed accordingly. Such sophisticated cost accounting systems enable the industry to determine whether or not specific products result in a gain or a loss. They are also used to establish prices for products. The impetus for such accounting systems reflect the profit motive in business.

However, in the major part of the nation's educational endeavors the primary motive is not profit-making. In fact, quite the opposite is true. Many educational institutions are chartered as non-profit institutions, and the usual profit motive is by predetermination, nonexistent. Furthermore, it is generally understood and accepted that tuition will not cover the entire cost of education, and auxiliary sources of support must be utilized.

Yet, for a number of reasons, it may be useful to determine the total cost of an educational program. Such data are helpful in preparing budgets, in raising funds, in planning new programs or expanding existing programs, and in increasing efficiency. Despite the advantages, cost analyses are sometimes shunned in the educational field because the necessary information is unavailable or difficult to obtain, because it is feared that the data will be incorrectly used in making comparisons, or that the information will be misinterpreted to reflect the quality of education (12).

Classification of Expenditures: Although institutions of higher education are held responsible for the funds they control, there is no single administrative directive, either governmental or non-governmental, which prescribes a single consistent system of accounting of expenditures for all institutions. Some of the state-wide systems of public higher education require standard accounting procedures, but private institutions are not similarly controlled.

Russell describes five bases for classifying expenditures in various educational institutions (12):

Character: on the basis of the type of payment, e.g., current expense, capital outlay, debt repayment.

Object: on the basis of the object for which the expenditure is made, e.g., salaries, equipment, heat.

Organizational Unit or Location: on the basis of the organizational unit for which an expenditure is incurred, e.g., college, school, division.

Function: on the basis for which the service is provided, for example:

Educational

- General administration and general expense
- Instruction
- Research
- Plant operation and maintenance
- Extension activities
- Museum and library

Non-Educational

- Carrying of debt (interest)
- Student aid (scholarships)
- Carrying of annuities
- Financial promotion
- Recruiting students

Fund: on the basis of funds which are affected, e.g., current funds, student loan funds, etc.

The identification of these classifications of expenditures highlight another major problem in cost analyses, i.e., that while costs are required according to one basis of classification (perhaps Function), the accounts of expenditures are often kept on another basis of classification (perhaps a combination of Organizational and Object classifications). As a result, in order to complete a cost analysis, the fiscal expenditures which are shown according to one classification must usually be recast and redistributed along another axis of classification. This step alone may require considerable effort.

Since the cost analysis is usually retrospective, the starting point must, of necessity, be existing fiscal records. Any cost analysis which is developed is usually limited by the degree to which existing fiscal information is subclassified. It is axiomatic that the closer the existing categories in fiscal expenditures correspond to the cost centers which are ultimately desired, the greater will be the sensitivity of the final cost data. The further apart the two classification are, the greater will be the number of assumptions which need to be made and the greater the number of sampling studies which may be required to arrive at estimating ratios. Furthermore, if a large number of estimates are required, the determination of costs will generally not be precise.

The variations in determining the allocation of costs introduce another limitation when inter-institutional comparisons are attempted. If the allocation of expenditures in existing fiscal records is not consistent from one institution to another, and the estimating procedures differ in number and/or in method, it will lessen the comparability of the results. This point is important to recognize if comparisons are to be made, because small differences may merely reflect a measurement error attributable to the method rather than to a real cost differential per se. Moreover, institutional characteristics such as size of the institution, geographic location of the institution, adequacy of financing, educational philosophy, and fiscal policies of institutions affect the educational costs. These, too, must be taken into account when comparing quantitative results.

Administrative Relationships: In determining the cost of allied health educational programs, the starting point is the total expenditures of the educational institution for which the costs are to be derived. This principle alone invites a number of problems. On the one hand, for single self-contained institutions of higher education, these total expenditures may be readily available to set the outer limits of the cost analysis. For example, in a hypothetical college, situated on one campus, with all the expenditures channeled through one individual or a small group of individuals, the determination of the total expenditures for a year (calendar, academic, fiscal) may be relatively simple. On the other hand, for a single college of a large university system such as State University of New York, with twenty six identifiable units, the identification of all expenditures referable to the single college becomes more difficult. For such a large university system, the expenditures for running the central office or the library should be shared by all of its constituents, allied health among them, and the expenditures should be allocated by some reasonable method. Therefore, as a general principle:

> In performing cost analyses for allied health educational programs, the expenditures for the largest academic unit of which the study institution is a part should provide the initial outer limit of expenditures for conducting the analysis.

In some instances, it will be found that a review for the entire university may not add substantially to the effort needed to complete the cost analysis for a particular college. However, such an assumption should not be made without verification.

Not all allied health educational programs are centered in one administrative unit in all educational institutions. In some institutions, the medical technology program may be administered by the Biology Department, and the dietetics program by the Home Economics Department, and graduate level education by the Graduate Division. In such administrative structures, expenditures may be distributed

in a number of separate expenditure accounts. The determination of costs of allied health educational programs under such administrative structures becomes more onerous, although it is not impossible. It is obvious that in order to determine the costs of particular allied health educational programs under these conditions, it would be necessary to include fiscal allocations from a number of departmental accounts.

In a substantial number of instances, allied health educational programs are conducted at academic institutions located at medical centers. The resources available for the present report did not permit detailed examination of accounting procedures to determine how the expenditures for allied health educational programs are handled under this situation. The unique characteristics of this type of organizational relationship would need to be explored if an actual cost analysis were undertaken.

Affiliate Institutions: In order to provide its students with practical experience as part of the professional or technical component of allied health education, a single academic institution may affiliate itself with clinical institutions or organizations. Since any hospital, clinic, or health department can accommodate only relatively few such student-trainees at any given time, some academic institutions must resort to a large number of affiliated institutions for such training. Following are but a few examples gathered from college catalogs:

Institution	Program	Number of Affiliates
Boston University	Health Dynamics	14
	Occupational Therapy	50
	Physical Therapy	42
Ohio State University	Medical Dietetics	6
	Occupational Therapy	34
	Physical Therapy	35
Quinnipiac College	Medical Technology	14
	Occupational Therapy	5
	Physical Therapy	3
	Cytotechnology	11
	Inhalation Therapy	4
Temple University	Occupational Therapy	23
	Physical Therapy	19
University of Connecticut	Physical Therapy	25

Not all of these affiliates accept students each year, but most of them do.

A number of practical considerations argue against including all of the costs of education in the affiliated clinical settings. The clinical affiliates for a number of allied health educational programs are often geographically far removed from the academic program. For example, Ohio State University lists eight clinical affiliates in California for its program in occupational therapy. The same program at Boston University uses affiliate institutions as far removed as Colorado. For either of these academic institutions to determine the total cost of providing the practical experience at a large number of distant locations is prohibitive.

On the other hand, the maintenance of such affiliate relationships may involve some expenditure on the part of the academic institution. If, as is sometimes the case, it is the policy of the academic institution to assess the nature of the student's clinical experience first-hand, a university staff member with some responsibility for the program may be requested to visit each affiliated institution. Ohio State University, as one example, requires that such visits be made annually for the occupational therapy program, and the cost of such travel is an expenditure to that academic institution.

The financial arrangements with the students for affiliated clinical experience are not standardized at all academic institutions. Based on conversations with some of the Cost Advisory Group, the following were a few patterns which were described:

Case Study A: The student pays a fee of $75 to the academic institution to support the cost of the paper work, and part of the faculty salary and travel expenses for supervision of clinical experience. Such expenditures would appear in the university accounts. Cost of training students on the part of the clinical affiliate is offset by providing the affiliate with a tuition voucher which allows a semester course for an employee in exchange for the training being given to the student.

Case Study E: Student pays regular per-credit tuition fee for academic credit granted for clinical experience. This money is used to pay part of the salary of clinical faculty at the clinical location. Such expenditures appear in the university accounts.

Case Study F: Student pays per-quarter fees to the university for the period of clinical experience. Expenditures for supervisory travel are reflected in the university accounts.

These illustrations probably do not cover the entire gamut of fiscal arrangements, but indicate that a number of alternatives exist. Thus, it is recommended that wherever expenditures are included in the accounts of the academic institution, they become part of the

cost analysis. Expenditures shown in the accounts of the clinical affiliates will not be included as part of the cost analysis for the academic institution, but should be included in cost analyses of clinical affiliates.

Cost Centers: Basic to the development of any cost analysis, is the designation of a set of "cost centers" to which all expenses will be allocated. Each of the studies which was reviewed for medical (1, 2, 4), dental (5), and nursing education (6-10), devised cost centers which seemed meaningful to its purposes. One study of medical education established the following cost centers (2):

Education

Undergraduate medical education (for M.D. degree)
Graduate education (for Masters and Ph.D. degrees)
Post-M.D. education - House staff instruction
Postdoctoral education
Continuing medical education (for practicing physicians)
Other education programs (dentistry, nursing, medical, etc.)

Research
Advisory service to granting agencies
Community and public health service
Patient services
Medical center - medical college administration and services
Other programs

The multi-disciplinary nature of allied health educational programs is in marked contrast to studies of medical education or nursing education. Each of these two broad areas has a limited number of educational programs. The educational cost centers for medical education shown above were limited to six categories. Nursing programs are generally divided into baccalaureate, associate and diploma programs, and only the first two are found in educational institutions. In contrast, allied health programs are more numerous. For example, at least one institution (Indiana University) reports as many as thirteen degree programs in allied health.

For the case studies undertaken for this report, the members of the Cost Advisory Group were asked to indicate the cost centers they felt to be meaningful. Two of the responses are included here:

Case Study E: The following cost centers were suggested de novo by this investigator.

Allied health instruction (including clinical education, administration, and general operations)
Basic science instruction
Arts and sciences instruction
Research

Federal training grants (income)
Public service
General university expense (library, student services, general administration)

Case Study F: This case study, reporting from a cost analysis which was conducted in 1969-70 listed the following cost centers for allied health. These are a combination of general cost centers and disciplines:

Graduate education
Post baccalaureate
Continuing medical education
Nursing graduate education
Research
Advisory and community service
Patient service
Medical dietetics
Medical technology
Medical illustration
Occupational therapy
Physical therapy
Nurse anesthesiology

A definite general recommendation cannot be made without further exploration.

Direct Costs: In distributing expenditures to cost centers, the sum total of expenditures are separated into two broad groups: direct costs and indirect costs. The direct costs relate to specific programs such as the salary of faculty members, purchase of supplies, etc.

The expenditures for salary of full-time or part-time faculty are easy to identify. However, as with other educational programs in the health field, allied health faculty may devote part of their effort to areas other than education. At medical centers, for example, four broad areas of activity have been identified, and the study of seven medical centers arrived at the following proportionate distribution of costs (2):

	Range Percent	Average Percent
Total Educational Programs	23.0-30.2	25.5
Research Programs	17.3-26.5	22.3
Patient Care Programs	42.1-55.7	49.0
Community Service Programs	.2- 4.9	1.1
Other Programs	.3- 4.9	2.1

Only about one-fourth of the total cost at each of the seven medical centers was for educational programs. In allied health programs, as well, cognizance should be taken of areas other than education to which faculty effort is being directed. One would expect that a much larger proportion of allied health costs will probably be represented by educational programs than is the case for medical centers. In addition to full-time faculty, a number of allied health educational programs make use of part-time faculty or perhaps share a faculty member with another program. The expenditures for such faculty need to be assigned to the appropriate specific programs on some rational basis.

In addition to faculty salaries, any other costs which can be identified as relating directly to one or more of the allied health educational programs, should be so allocated. Examples of such expenditures, in addition to faculty salaries, are salaries for secretaries and clerical help, supplies, travel, equipment and purchased services.

Indirect Costs: The remaining expenditures of the academic institution will need close examination. They should be considered from the following points of view:

1. Those expenditures which are definitely not related to allied health educational programs. These are allocated to non-allied-health expenditures and are excluded from the cost analysis for allied health educational programs.

2. Those expenditures which are partially related to allied health educational programs. Each of these requires a decision as to the method of allocating some portion to specific allied health educational programs and allocating the residual to non-allied-health programs.

The allocation of indirect expenditures can be determined either on an *a priori* basis or on the basis of special sampling studies. Expenditures should be considered in relationship to the total expenditures to determine whether greater efforts are needed to further refine the allocations through sampling studies. If only a small amount of money is involved, additional effort to further refine the data may not be warranted. In such cases, the decision as to the allocation may be made on *a priori* basis.

On the other hand, the allocation of sizeable expenditures is a necessary step. As an example, the expenditures for the library at an institution of higher education are considerable, and cannot be ignored. The library is used by all students, allied health students among them, and serves an educational purpose. Therefore, some portion of its expenditures should be allocated to allied health educational programs. Two suggested methods for allocating

library costs which have been suggested are: (a) in proportion to the books circulated to allied health students over a sample period, or (b) in proportion to new book accessions for the allied health school or department.

The expenditures for the registrar's office could be prorated on the basis of registered students in allied health educational programs or the number of transcripts issued for allied health students.

The expenditures for plant operation could be prorated on the basis of square feet of floor area, or cubic feet of building space.

Whatever methods are decided upon, the important fact is that every expenditure must be allocated in whole or in part to, or completely excluded from, allied health educational costs.

Another method which has been used to allocate individual costs in studies of costs of medical education is the Step-Down Method. This is a method which is also rather widely used in hospital cost analyses, where the expenditure of all departments are allocated to the functions identified as income-producing in order to compare the charges for various activities (11). The allocation is accomplished by arranging departmental expenditures in order of importance to the functions being performed, with the most general department (overhead) first. As each department's expenditures are allocated to functions, the analysis proceeds another step down to the next department. Finally, all departmental expenditures have been allocated to specified functions. A similar procedure is described for cost analyses in nursing education (6).

If unit costs are desired, another factor entering into the process is the number of students in the various programs:

Case Study A	Student Enrollment
Health dynamics	106
Occupational therapy	100
Physical therapy	263
Case Study D	
Medical technology	28
Medical illustration	9
Medical record science	27
Radiologic technology	31
Dental hygiene	23

Case Study F	Student Enrollment
Circulation technology	12
Health and hospital administration	18
Medical dietetics	51
Medical illustration	8
Medical technology	56
Occupational therapy	95
Physical therapy	113

Discussions with educators have indicated that enrollments of over 100 are unusual, and that it is more common to have enrollments in specific disciplines of less than 50 students. It would not appear reasonable to invest too much effort in detailed allocation of costs if there are many programs at an educational institution and most programs have very few students. Therefore for the first studies in cost of allied health educational programs, it is recommended that institutions with relatively few programs, but with relatively large enrollments be used.

SUMMARY AND CONCLUSIONS

Because of the rising costs of medical care, the rising costs of education of health workers, and the possibility of a national health insurance system, our nation is becoming increasingly aware of costs of health care and costs of education of health workers. Several studies have been conducted of the cost of educating some members of the health care team: medical education, dental education, nursing education for collegiate programs, and nursing education for basic diploma programs. However, the costs of allied health education have to date received relatively little attention. As the allied health component of medical care receives increasing attention, the needs for information regarding the costs of allied health education are also increasing.

The present report represents an initiation into the methods of cost analysis, and an attempt on the part of the Cost Advisory Group to conduct case studies at their institutions. Based on those efforts, several recommendations regarding the conduct of cost studies are made.

First, it is recommended that a period of study be devoted to developing and identifying the specific questions to be answered. The problem as specified in the NIH contract proved vague and unstructured. It did not define what kind of costs, whether on a current or completed basis, cost to whom, etc. The greatest present need is to define the problem, i.e., the "cost" which is desired.

Once the problem is more clearly defined, it is recommended that pilot studies be undertaken in a small number of allied health programs to establish a method of cost analysis. For these first studies, the goal should be the development of methodology. The institutions should be selected with the following criteria in mind:

1. That the school represent a variety of allied health curricula.
2. That the school shall have a fairly large number of students pursuing any given allied health curriculum and that there be only a few allied health curricula at the school
3. That the school be an academic instituion with relatively few affiliates for practical training.

These recommendations are for the purpose of minimizing the extraneous complexities encountered in many situations.

The pilot studies should be supported with adequate funds to supply the manpower needed for a series of in-depth methodological studies of costs of allied health educational programs. From studies in other health educational fields (i.e., medical, dental, nursing) it is obvious that if comparisons are to be made the financial data

must be handled in a consistent fashion. Any idea that such cost analyses can be undertaken in a casual fashion or on a part-time basis by available persons is unrealistic. The case studies presented in this report document the problems which are present in such an unsupported undertaking.

In developing the methodology for cost analysis of allied health educational programs, careful thought must be given to the purpose for which the methods are to be devised. If the purpose is to devise a method which can be used as a guide for an educational institution to determine its own costs, then a general methodology will suffice. That method could be adapted by any institution to suit its own needs. The derivation of the total expenditures for allied health at an academic institution is of interest to that institution, but would also be useful as an element in accumulating the cost of allied health educational programs for a university system, for a state, or hypothetically even for the nation. The derivation of a total program cost for the totality of all allied health programs would be relatively meaningless for comparative purposes because of the mixes of curricula, and varying enrollments at the various institutions.

If the purpose of conducting cost analyses is to <u>compare</u> the costs under different situations, the methods must be much more structured and the costs should be reported on a unit basis. It is one thing to analyze an institution's expenditures to determine what portion of its total expenditures is for allied health, and quite another to determine unit costs per student by curricula (i.e., discipline and degree level).

The total expenditures for allied health educational programs at an academic institution depends on two factors: (1) the expenditures for particular curricula; and (2) the combination of curricula at that institution. Unless the same combination of curricula exists at the institutions to be compared, a comparison of the total expenditures is meaningless. Even if the same combination of curricula exists at two institutions, for comparative purposes the information should be reduced to unit costs per student. Therefore, if inter-institutional comparisons are to be made, expenditures for allied health educational programs should be unit-cost expenditures for specific curricula. The procedures required to derive such costs demand the close attention of someone conversant with accounting procedures.

In the course of the analyses, many decisions will need to be made. It would be unreasonable to expect any university to institute an accounting system for the entire institution in order to determine the cost of educational programs in allied health. Therefore, the analyses must proceed from existing records, and be augmented by sampling studies at various critical points. Unless carefully controlled, this general approach may require numerous studies in order

to make minute allocations. While it is necessary to make sound decisions based on factual information, it is also necessary to guard against the expenditure of undue effort to make decisions concerning relatively small expenditures.

None of the case studies which are included in this report are complete examples of a cost analysis. As a consequence, they did not encounter some other points needing resolution. For example, what is to be done about capital construction? If an institution is building an entirely new educational facility for allied health, the inclusion of the expenditures for such an undertaking in a single year would yield an inflated cost of education. Shall expenditures be limited to current operating expenses? If an expensive piece of equipment is purchased which can be used for many years, how shall that expenditure be handled? If a car is purchased to replace a car assigned to allied health faculty, how shall the expenditures for that vehicle be handled? Numerous other questions of this sort will need the attention of a professional accountant with guidance from allied health educators.

Because of the degree of expertise and involvement which are needed, it is recommended that cost study groups be established to work exclusively on this problem. At least three types of expertise are needed:

1. Uses of factual data in educational planning and health care planning

2. Accounting principles and accounting procedures

3. Conduct of allied health educational programs

With such a broad approach, one might expect that another bridge may be built between the academic community which is producing health workers and the health care community which is utilizing health workers.

The problems associated with cost analysis are many, but they are not insoluble. They should be regarded as a challenge and voluntarily accepted as such. If they are not undertaken as a challenge, they may become an unavoidable necessity in coping with increasing costs of health care and health education.

* * *

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Section II

CASE STUDIES OF THE COST ADVISORY GROUP

SECTION II

CASE STUDIES OF THE COST ADVISORY GROUP

This section contains the information relevant to the Case studies carried out by the seven members of the Cost Advisory Group of the Association of Schools of Allied Health Professions. Included are copies of the materials presented to the Group at the outset of the study, including examples of cost centers developed in medical, nursing and dental education. These are followed by the seven case studies.

Each case study includes Comments and Institutional Characteristics abstracted by the ASAHP research staff from a number of sources, and fiscal information prepared by the Cost Advisory Group.

At the outset, it was anticipated that each case study would include financial data, and because of the sensitivity regarding disclosure of financial information, it was agreed that no institution would be identified by name. Honoring that agreement, the case studies are identified by an arbitrary lettering system which bears no known relationship to any characteristic.

The case studies which are included cannot be interpreted as representative of the entire range of institutions. Indeed, quite the contrary is true. Since all of the members of the Cost Advisory Group come from institutional members of the Association, they would tend to be among the leaders in the field, tend to be located in larger educational institutions, and to have more complex administrative structures.

The task undertaken by the Cost Advisory Group was to identify problem areas and for this purpose it was not necessary to have a representative sample of all allied health educational institutions. The institutions represented by the Cost Advisory Group constitute complex situations, a characteristic which proved advantageous for the purpose of identifying problems.

ASSOCIATION OF SCHOOLS OF ALLIED HEALTH PROFESSIONS

One Dupont Circle, N.W., Washington, D.C. 20036 Telephone: (202) 293-3422

May 12, 1970

MEMORANDUM TO: EXECUTIVE COMMITTEE

FROM: Helen C. Chase, Dr. P.H., Director of Research

SUBJECT: Review of Costing Procedures

As you know, the Association is contractor with the National Institutes of Health in the conduct of a study entitled "The Development of a Reporting System for Allied Health Manpower Education in Four-Year Colleges and Universities". As part of our contract, we are required to review various procedures for determining the cost of educating various kinds of students and to make recommendations about the procedures which we think should be followed. (See attachment). In order to do this, I suggested to Dr. Hamburg that we organize teams of two individuals each from a small number of schools. These two individuals should be: 1) the dean or someone with an intimate knowledge of the programs, 2) a fiscal person with an intimate knowledge of the school or university accounting system.

Each team would review the educational program and the accounting system at its own institution. The purpose is to present a brief report of a method to determine the cost of educating each type of allied health student at that institution. Actual figures should be used, although they need not be for the current year. At this stage of the development of the problem, the chief interest is in illustrating various ways of computing the costs, and for this purpose the budget and fiscal categories which exist at the college or university should be used. No new methods or accounting systems are to be developed.

Once the information has been compiled and submitted to the Association, it will be summarized for transmittal to the National Institutes of Health. At that point, institutions can be designated by code letter (such as A, B, C,) to protect the identity of the individual school and person reporting if that is felt to be desirable.

This study is methodological in nature. Its purpose is to review the elements which are individually identified in various college accounting systems, and to become acquainted with their mechanisms of determining

the cost of educating a student. The study cannot be used to compare the cost from one institution to another. The reason for asking that real figures be used is to give some semblance of reality to the material presented.

Dr. Hamburg felt that the ideal group to participate in this study would be the Executive Committee, and the item has been put on the agenda for the Committee's next meeting in Washington, D.C. With the development of some guides to the undertaking, each team would be requested to submit its report by August 1, 1970, to allow time to prepare a summary and illustrative materials before submitting the Association's report to the National Institutes of Health. Will you please be prepared to discuss this matter at the next Executive Committee Meeting and, if possible, please bring with you some illustrative materials of the accounting categories which are currently used by your institution.

Your participation in this important aspect of the project would be very much appreciated.

EXCERPTED FROM CONTRACT BETWEEN NATIONAL INSTITUTES OF HEALTH AND ASSOCIATION OF SCHOOLS OF ALLIED HEALTH PROFESSIONS, NO. NIH 70-4051, PH (108-69-64)

One aspect of the contract requires a review of the procedures related to determining costs of education in allied health.

"the Contractor shall specifically:

4. Review practices followed in determining the costs of educational programs and prepare recommendations for this which are specifically applicable to allied health occupations programs.

    a. Review costing procedures recommended or followed by major Federal and non-Federal official and voluntary organizations, including procedures applicable to medical, dental, and nursing education.

    b. Review procedures followed by colleges or educational programs directors in costing individual allied health occupations programs .

5. Recommend one or more sets of institutional costing procedures to be followed, applicable to allied health occupations academic programs at sub-baccalaureate, baccalaureate, and post-baccalaureate levels in order to develop costs of the professional or technical component of such programs, including practicum training, teaching, administration, faculty development, and general operations."

ASSOCIATION OF SCHOOLS OF ALLIED HEALTH PROFESSIONS

One Dupont Circle, N.W., Washington, D.C. 20036 Telephone: (202) 293-3422

PROJECT: EXPLORATION OF COST ANALYSIS FOR ALLIED HEALTH

CHARGE TO ASAHP

Review practices in determining costs of educational programs (e.g., medical dental, nursing); and

Recommend one or more sets of institutional costing procedures applicable to allied health occupations academic programs at pre-baccalaureate, baccalaureate, and post-baccalaureate levels to develop costs of professional or technical components of such programs, including practicum training, teaching, administration, faculty development, and general operations.

"COST" ADVISORY GROUP

COST to the university (college) of operating the school (division, department) of allied health.

This attempt is exploratory in nature, examining methods used in other health professions educational systems, and attempting cost analysis in allied health to identify problems.

I. Description of the institution

- A. Geographic description
- B. Sponsorship
- C. Organization
- D. School (division, department) of allied health
  1. Faculty
  2. Calendar system; summer school
  3. Programs
  4. Students enrolled in each program

II. Establishment of Cost Centers

- A. Identify time period
- B. Review cost centers of medical, dental, nursing education
- *C. Determine cost centers which are meaningful for allied health education

III. Expenditures for Entire Institution

- A. Identify fiscal year
- B. Have any such studies been done at this institution before?
- C. To determine cost, one needs to distribute to allied health that portion which should be allocated to that segment of the total institutional expenditures
- * D. Under what categories are expenditures reported at this institution?

*IV. Distributing Expenditures to Cost Centers

A. Direct Costs - those costs which are clearly identifiable as those of allied health education, e.g., allied health faculty salaries
B. Indirect Costs - those costs which are not entirely allied health; but which must be shared by a number of units of this institution, e.g., university administration
C. Unallocated Costs - those costs which are definitely not allocated to allied health, e.g., self-supporting, non-institutional enterprises such as bookstores, cafeterias, dormitories, student unions.

* Areas requiring particular attention

June 8, 1970
HCC

Source Materials Provided to ASAHP Cost Advisory Group

American Dental Association. Annual Report on Dental Education 1968/69, Part 4, Financial Information. Chicago, Council on Dental Education, 1969.

Members of the Cost Advisory Group were also provided with a copy of the questionnaire used by the American Dental Association in obtaining the financial information used in the above publication.

Campbell, Thomas J. Program Cost Allocation in Seven Medical Centers - A Pilot Study. Association of American Medical Colleges, 1969.

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Examples of Cost Centers

I. Medical College Cost Centers

1. Undergraduate Medical Education (leading to M.D. degree)
2. Graduate Education (M.S., Ph.D.)
3. Intern and Resident Education
4. Continuing Medical Education for Practicing Physicians
5. Other Educational Programs
6. Postdoctoral Education
7. Research
8. Advisory Services to Granting Agencies
9. Hospital, Clinic, and Physician Services
10. Patient Services
11. Community and Public Services
12. Medical Centers and Medical College Administration and Services
13. Medical College Research Institute
14. NIH Clinical Research Centers
15. Heart, Cancer, and Stroke Center
16. Other Programs

SOURCE: Campbell, T.J.: Program Cost Allocation in Seven Medical Centers - A Pilot Study. Association of American Medical Colleges, 1968.

PARTICIPANTS FOR PHASE 2
OF COST ALLOCATION PROJECT

University of Arizona
*Bowman Gray Medical School and The North Carolina Baptist Hospital
*University of Michigan
University of Mississippi
University of Missouri
University of Connecticut
Duke University
University of Florida
George Washington University
University of Illinois
*University of Iowa
*Thomas Jefferson University
University of Kansas
*New York University
State University of New York at Syracuse
*Ohio State University
University of Pennsylvania
University of Rochester
Stanford University
*University of Utah
Vanderbilt University

*Participants in Phase 1 of Cost Allocation Project
Association of American Medical Colleges

II. Dental Education

II. (A) Dental Education Programs

1. Dental Education: for D.D.S. or D.M.D. degree
2. Graduate Education
3. Intern and Resident Education
4. Postgraduate Dental Education
5. Education for Medical Students
6. Education for Dental Hygienists
7. Education for Dental Technicians
8. Education for Dental Assistants
9. Education for Public Health Students
10. Research
11. Advisory Services to Granting Agencies
12. Services to Teaching Hospital
13. Services to Other Hospitals, Clinics, Institutions, Dentists
14. Community and Public Services
15. Other Programs

SOURCE: American Association of Dental Schools: Cost Study of Dental Education. Sponsored by W. K. Kellogg Foundation, 1965.

II. Dental Education (Cont.)

II. (B) Sources of Income

1. Dental Trust Funds
2. Federal Research Grants
3. Federal Teaching and Training Grants
4. Non-federal Research Grants
5. Non-federal Training Grants
6. Hospitals
7. Contributed Services of Volunteer Faculty
8. Instruction Contributed by Other Schools
9. Other Income
10. Tuition and Fees
11. Student Clinic Income
12. Overhead on Grants
13. Total from Outside Sources and Beneficiaries of Dental School Programs
14. Unrestricted University or Dental School Income, Reserves, Appropriations

SOURCE: American Association of Dental Schools: Cost Study of Dental Education. Sponsored by W.K. Kellogg Foundation, 1965.

III. Nursing Education

Average Cost .. implies that all expeditures of the institution must be taken into consideration in order to derive the total cost of any one of its activities or functions -- in this case, nursing education. Most items of expenditure are analyzed to ascertain how much of the expenditure should be apportioned to nursing education. There will be other items however, which may not be directly concerned with nursing education (for example, auxiliary enterprises or organized research) yet must be included in the analysis in order to spread overhead costs equitably among all activities and functions.

Cost Centers

1. Operation and maintenance (to be redistributed)
2. General Institutional expense
3. General administration
4. Auxiliary enterprises
5. General library
6. University hospital
7. Other organized activities
8. Student aid
9. Student services
10. Arts and sciences
11. Nursing education
12. All other organized units of instruction
13. Organized research
14. Extension and public service
15. Maintenance of the Religious

Examine total current operating expenditures according to organization and function in each of the institutions participating in the educational programs in nursing. Each cost center is examined to determine what portion of its combined direct and indirect expenditures is chargeable to nursing education.

Nursing service activities on a ward may be thought of as directed toward four types of goals:

Assuming and promoting the recovery, safety, and welfare of patients
Providing for the comfort of patients
Satisfying esthetic considerations (e.g., maintaining order, cleanliness tidiness)
Promoting institutional objectives not directly related to the care of patients (e.g., making reports, orienting new workers, making schedules).

SOURCE: Knott, L. W., Vreeland, E. M., and Gooch, M.: Cost Analysis for Collegiate Programs in Nursing. National League for Nursing, 1956.

III. Nursing Education (Cont.)

Cost Centers

1. Staff Benefits
2. Operation and Maintenance of Physical Plant
3. General Institutional Expense
4. General Administration
5. Auxiliary Enterprises
6. General Library
7. University Hospital
8. Other Organized Activities
9. Student Aid
10. Student Services
11. Arts and Sciences
12. Nursing Education
13. Use Value of Buildings
14. All Other Organized Units of Instruction
15. Organized Research
16. Extension and Public Service
17. Maintenance of the Religious

SOURCE: Rowe, H.R. and Flitter, H.H.: Study on Cost of Nursing Education. Part II - Cost of Basic Baccalaureate and Associate Degree Programs. National League for Nursing, 1965.

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CHARACTERISTICS OF ALLIED HEALTH EDUCATIONAL UNITS
REPRESENTED IN CASE STUDIES

CASE STUDY	ALLIED HEALTH UNIT	NUMBER OF ALLIED HEALTH PROGRAMS	LOCATED AT MEDICAL CENTER?	TYPE OF INSTITUTION
A	College	3	No	Private
B	Not centrally organized	7	No	Public
C	Division within College of General Studies	5	No	Public
D	School within Medical College	5	Yes	Public
E	School within College of Health Related Professions	5	No	Public
F	School within College of Medicine	10	Yes	Public
G	College	8	Yes	Public

CASE STUDY "A"

COMMENTS

The data which were provided in this case study are not expenditures, but budgeted figures.

A number of significant costs have been omitted from the presentation. The cost of physical plant (services and repairs), administration, library and student services are omitted from the computation. Students in the first two years of each program have three-quarters of their courses in other schools and colleges of the University, and the costs are not reflected in the budget of this college. The table is limited to undergraduate education although the college offers master's and baccalaureate degrees in each field. The master's programs are administered by the Division of Graduate Studies, and their budget figures are not included in this case study.

As a result of these omissions, the total costs per program, or the average costs per student are understatements. The investigator was aware of these omissions and called attention to them.

CASE STUDY "A"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	An urban University in the North East. The Medical Center of the University is physically separated from the main campus but is also within the city limits.
Sponsorship	Independent
Organization	Headed by a president who is directly responsible to the Board of Trustees. Each college or school is administrered by a dean. Divisions within a school operate under the direction of a chairman. There are sixteen colleges within the University.
Enrollment	17,000 students at the University
Highest Offering	Doctorate

College of Allied Health Professions

Organization	Operates as a separate college under the direction of a dean. Each division of the college has a chairman; each program comprises a division. The Master's programs are housed in the Division of Graduate Studies.
Calendar System	Semester System
Programs	Health Dynamics (Baccalaureate, Master's) Occupational Therapy (Baccalaureate, Master's) Physical Therapy (Baccalaureate, Master's)
Accreditation	Occupational Therapy - Council on Medical Education, AMA, in collaboration with the American Occupational Therapy Association Physical Therapy - Council on Medical Education, AMA, in collaboration with the American Physical Therapy Association.
Number of Institutions Affiliated for Clinical Training	Health Dynamics - 14 Occupational Therapy - 50 Physical Therapy - 42
Faculty	34 Full-time
Enrollment by Program	Health Dynamics - 106 Occupational Therapy - 100 Physical Therapy - 263

CASE STUDY "A"

FISCAL INFORMATION

APPROXIMATE BUDGET FIGURES - ACADEMIC YEAR 1969-70
UNDERGRADUATE PROGRAMS IN HEALTH DYNAMICS, OCCUPATIONAL THERAPY, PHYSICAL THERAPY

	Health Dynamics	Occupational Therapy	Physical Therapy	Total
Salaries - Instructional	$52,400	$36,600	$56,100	$145,100
Salaries - Secretarial/ Clerical	5,000	6,200	6,300	17,500
Supplies and Expense	450	1,000	900	2,350
Travel	150	800	1,700	2,650
Equipment	1,300	500	2,000	3,800
Services Purchased (Tuition Credit Vouchers for Clinical Affiliation Supervisors)		3,200	6,000	9,200
TOTALS	$59,300	$48,300	$73,000	$180,600

ENROLLMENT SEMESTER I 1969-70

Freshman	22	24	90	136
Sophomore	21	26	70	117
Junior	28	28	60	118
Senior	35	22	43	98
TOTALS	106	100	263	469

NOTE: The figures above indicate approximate budget figures for each of the undergraduate programs for the academic year 1969-70, together with the enrollment in each program. The budget amounts have been rounded.

Also, students in the first two years of each program have three-quarters of their courses in other schools and colleges of the University, the costs of which are not reflected in this college budget.

A study of budgets of the College over the last several years indicates that in excess of 50% of tuition income is required to meet budgetary expenses primarily for the instructional programs - academic salaries and functions.

CASE STUDY "B"

August 25, 1970

Dr. Helen Chase
Association of Schools of Allied Health Professions
One Dupont Circle, N. W.
Washington, D.C.

Dear Dr. Chase:

We've just reviewed once more the characteristics of our allied health program at this University with reference to being a participant in your study. It is obvious to us that not being established as an academic division restricts the kind of information that would be applicable to the study. Furthermore, the cost "procedures" used by the University as a whole won't reveal information of any pertinence.

I suspect that at this point, our best plan is to not participate in your study - and, thereby, not contribute erroneous or misleading information.

Cordially,

CASE STUDY "B"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	A university located in the North Central part of the United States.
Sponsorship	State-supported
Organization	One of four campuses of the University System. The System is directed by its president; each campus operates under a chancellor. The fifteen colleges and schools at this campus are operated by their respective deans. Individual departments are the responsibility of their chairmen.
Enrollment	21,000 students at this campus of the University.
Highest Offering	Doctorate

Status of Allied Health

Organization	No specific organizational unit exists for allied health programs. The programs are scattered through three colleges and are coordinated by the Office of Inter-campus Instruction.
Calendar System	Semester System
Programs	Dietetics - College of Home Economics (Baccalaureate, Master's, Doctorate) Inhalation Therapy - College of Education (Baccalaureate) Medical Technology - College of Education (Baccalaureate, Master's) Occupational Therapy - College of Education (Baccalaureate) Physical Therapy - College of Education (Baccalaureate) Radiologic Technology - College of Education (Baccalaureate) Sanitary Science - Graduate School (Baccalaureate, Master's)

CASE STUDY "B" (Cont.)

Accreditation	Dietetics - American Dietetic Association (approved) Inhalation Therapy - Council on Medical Education, AMA, in collaboration with the American Association for Inhalation Therapy. Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists Physical Therapy - Council on Medical Education, AMA, in collaboration with the American Physical Therapy Association Radiologic Technology - Council on Medical Education, AMA, in collaboration with the American College of Radiology and the American Society of Radiologic Technologists
Number of Institutions Affiliated for Clinical Training	Not available from college catalog
Faculty	Not available from college catalog
Enrollment by Program	Not available from college catalog

CASE STUDY "C"

COMMENTS

The following pages are the result of a survey of medical technology programs in southeastern United States conducted in 1969. These were provided by the investigator for case study "C" as an example of cost analyses which had been completed in a prior year.

Of 106 survey forms which were distributed, 33 replied. Four of these were unable to estimate costs and are not included in computing averages. The data for the 29 complete survey forms are based on budget allocations rather than expenditures.

Pages 53 and 54 demonstrate the data for individual schools, and highlight the difficulty in obtaining estimates for consistent fiscal categories which are essential if inter-institutional comparisons are to be made. In both tables, NE (no estimate) appears frequently.

Page 55 is a copy of the form used for the survey.

CASE STUDY "C"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	An urban institution located in the South
Sponsorship	State-supported
Organization	A branch campus of a University, the main campus of which is located elsewhere. Each campus of the University has a president; each president is responsible to the Board of Trustees. Each college of the University is administered by a Dean. Divisions of a college have their own chairmen.
Enrollment	4,500 students at this campus of the University
Highest Offering	Doctorate

Division of Allied Health Sciences
(College of General Studies)

Organization	College of General Studies is administered by a Dean; the Division of Allied Health Sciences is under the supervision of a chairman. Each program is organized as a department.
Calendar System	Quarter System (however, credit given in SEMESTER hours)
Programs	Dietetic Internship (required for professional certification; enrollees must already possess a baccalaureate degree) Medical Technology (Baccalaureate) Occupational Therapy (Baccalaureate) Physical Therapy (Baccalaureate) Radiologic Technology (Baccalaureate)
Accreditation	Dietetic Internship - American Dietetic Association (approved) Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists

	Physical Therapy - Council on Medical Education, AMA, in collaboration with The American Physical Therapy Association Radiologic Technology - Council on Medical Education, AMA, in collaboration with the American College of Radiology and the American Society of Radiologic Technologists
Number of Institutions Affiliated for Clinical Training	Not available from college catalog
Faculty	Not available from college catalog
Enrollment by Program	Not available from college catalog

CASE STUDY "C"

AVERAGE COST OF MEDICAL TECHNOLOGY PROGRAMS

Tabulation of Results of Survey Conducted September, 1969

Institutions surveyed were from a list of AMA Approved Schools of Medical Technology September 15, 1969, and were selected as follows:

	# Surveyed	# Replies	% Return
1. All schools in 7 states comprising Region III ASMT (So.East)	90	26	35
2. Selected University Schools outside Region III	10	6	60
3. Selected Clinical Lab. based schools outside Region III	6	1	17
	106	33*	31

For tabulation the replies were grouped as follows:

I.	University Based Schools	9
II.	Clinical Laboratory Based Schools	20
		29*

*Four schools (1 University and 3 Clinical Laboratory Based) were unable to estimate any costs and, therefore, were not considered in computing averages.

	# Schools	Average Budget Allocations*				Avg.# Stud.	Avg. Cost/ Student
		Faculty Salaries	Stipend	Other**	Total		
Group I	9	$59,300(73%)	$7,800(10%)	$14,200(17%)	$81,300	24	$3,400
Group II	20	$14,400(48%)	$9,100(30%)	$ 6,600(22%)	$30,100	5	$5,900

* Figures to nearest $100

** Includes Tutorial Instruction, Supplies, Equipment, Teaching Aids, Library, Teaching Facilities, Recruitment, Travel and Miscellaneous.

University Based Programs

	# Schools	# Students	Average Total Budget	Cost/ Student
No Stipend	6	26	68,776	2,645
Stipend	3	19	106,158	5,587

Therefore stipend adds to cost approx. $2900 per student.

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GROUP I (UNIVERSITY BASED SCHOOLS) RAW DATA

School #	#Grad 1969	Faculty Sals.	Tut Instruc.	Suppl.	Equip.	Teach Aids	Library	Teach Facil	Recruit.	Stipends	Travel	Other
1	20	35,000	0	9,000	19,000	1,000	500	2,000	500	43,000	1,000	0
2	20	65,173	N.E.	2,900	7,000	Inc. Sup & Equip	Inc in Sup.	0	Inc in Sup & Travel	24,000	1,700	0
3	20	32,750	0	Inc in OTHER	0	Inc. in OTHER	Inc in OTHER	0	Inc in OTHER	0	Inc in OTHER	2,500
4	13	58,960	0	Inc in OTHER	N.E.	Inc. in OTHER	300	Inc.in OTHER	Inc in OTHER	0	Inc in OTHER	12,423
5	17	100,000	100	500	2,000	200	N.E.	N.E.	500	3,000	200	0
6	23	58,000	8,500	6,000	N.E.	Inc Sup	500	N.E.	0	0	0	0
7	27	59,300	0	6,000	3,000	5,000	N.E.	N.E.	N.E.	0	Inc in OPER-ATING	0
8	55	59,675	0 orNE	2,500	3,000	500	200	N.E.	N.E.	0	500	N.E.
9	17	65,000	0	5,300	5,000	0	0	0	0	0	500	18,240
OTALS	212	534,058	8,600	32,200	39,000	6,700	1,500	2,000	1,000	70,000	3,900	33,168

N.E. = No estimate

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GROUP II (CLINICAL LAB BASED SCHOOLS) RAW DATA

School #	#Grad 1969	Faculty Sals.	Tut Instruc	Suppl.	Equip.	Teach Aids	Libry	Teach Facil	Recruit.	Stipends	Travel	Other
1	10	20,000	9,824	N.E.	N.E.	50	270	N.E.	N.E.	378	0	900
2	10	50,000	In fac Sal	3,000	8,000	250	0	3,000	0	1,800	0	0
3	9	7,800	0	1,250	7,000	250	400	2,000	0	12,000	0	0
4	8	20,000	500	N.E.	N.E.	300	200	N.E.	300	30,000	500	0
5	8	8,400	N.E.	500	N.E.	500	N.E.	N.E.	N.E.	9,600	500	0
6	6	9,780	N.E.	350	1,500	250	200	N.E.	N.E.	12,300	250	0
7	5	24,000	N.E.	100	N.E.	300	400	N.E.	100	8,000	2,000	0
8	5	15,000	N.E.	N.E.	N.E.	500	400	N.E.	200	24,000	200	N.E.
9	5	12,000	0	6,000	1,000	200	300	3,000	0	4,400	2,000	500
10	4	20,000	12,000	2,000	5,000	500	500	3,000	In fac Sal	15,000	8,000	0
11	4	20,232	0	100	200	250	800	8,000	175	10,400	300	0
12	4	8,508	2,075	250	500	2,250	1,000	3,500	N.E.	1,500	250	0
13	3	0	0	50	0	300	Inc Teach Aides	N.E.	50	2,500	20	0
14	3	9,690	8,770	200	2,000	150	500	1,250	125	7,128	200	0
15	3	7,600	1,000	N.E.	1,200	600	800	1,000	N.E.	10,200	500	N.E.
16	2	8,200	N.E.	150	N.E.	100	200	0	N.E.	600	500	0
17	1	8,000	0	N.E.	400	300	100	0	0	9,600	400	0
18	1	10,522	In fac Sal	N.E.	N.E.	N.E.	N.E.	N.E.	100	7,600	350	0
19	1	8,823	0	N.E.	200	100	285	N.E.	0	2,226	285	0
20		20,000	0	175	300	30	200	240	35	12,000	275	0
TOTALS	90	288,555	32,169	14,125	27,300	7,180	6,555	24,990	1,085	181,232	16,530	1,400

N.E. = No estimate

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Please mail this questionnaire to:

Medical Technology Program
University

QUESTIONNAIRE

1. Estimate of total cost of Medical Technology program per year

		No estimate Available
A. Faculty salaries & benefits	_____	_____
B. Tutorial Instruction	_____	_____
C. Expendable supplies	_____	_____
D. Equipment	_____	_____
E. Teaching aides (AV etc.)	_____	_____
F. Library	_____	_____
G. Teaching Facilities (Rent overhead and other costs)	_____	_____
H. Recruitment	_____	_____
I. Student stipends and other benefits such as scholarships tuition housing uniforms	_____	_____
J. Travel - Faculty and student	_____	_____
K. Other: _____	_____	_____
TOTAL	_____	

2. Source(s) of Funds

A.

B.

C.

D.

E.

CASE STUDY "D"

COMMENTS

Of the cost studies conducted by members of the Cost Advisory Group, Case Study "D" was the only one which provided a list of its actual expenditure categories, but financial data are not included.

This institution has noted some of its anticipated problems in cost analysis:

1. Costs for student housing, bookstores, food service, and capital improvement are not shown separately in the college accounts.

2. Variable program lengths for allied health programs.

3. Part-time faculty are used

4. Expenditures reflect entire medical center (educational institution and patient care facility).

This institution has not established cost centers for instruction and research programs. A statistical formula is used to prorate costs for instruction and research, and for patient care performed at the affiliated hospital and clinics. Although cost centers have been established for the hospital and clinic functions, allied health activities related to patient care have not been identified. Since allied health cost centers have not been established for instruction and research, meaningful cost centers do not exist for allied health education at the present time.

CASE STUDY "D"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	A medical college located in the South.
Sponsorship	State-supported
Organization	Operates as a senior unit of the University System and is the health education center of the system. Chancellor administers the University System; presidents are responsible for the individual colleges. Medical College consists of 5 schools, the Deans of which report to the President. The schools are divided into departments; each department is the responsibility of its respective chairman.
Enrollment	800 students at the medical college
Highest Offering	Doctorate

School of Allied Health Sciences

Organization	Consists of 5 departments, each controlled by a chairman, and each department representing one program. Students are admitted at the junior year level after completing 2 years of liberal arts studies at other institutions. (This does not apply to students enrolled in the Radiologic Technology certificate program). General courses required by students after entering the Medical College are offered by another college, also part of the University System, and in close proximity to the Medical College.
Calendar System	Quarter System
Programs	Dental Hygiene (Baccalaureate) Medical Illustration (Baccalaureate, Master's) Medical Record Science (Baccalaureate, Master's) Medical Technology (Baccalaureate) Radiologic Technology (Certificate, Baccalaureate) Occupational Therapy (to be activated during FY1970-71) Physical Therapy (to be activated during FY1970-71)

CASE STUDY "D" (Cont.)

Accreditation	Dental Hygiene - Council on Dental Education, ADA	
	Medical Illustration - Association of Medical Illustrators	
	Medical Record Science - Council on Medical Education, AMA, in collaboration with the American Association of Medical Record Librarians	
	Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists	
	Radiologic Technology - Council on Medical Education, AMA, in collaboration with the American College of Radiology and the American Society of Radiologic Technologists	
Number of Institutions Affiliated for Clinical Training	Dental Hygiene	- 1
	Medical Record Science	- 7
Faculty	16.9 Full-time equivalents	
Enrollment by Program	Dental Hygiene	- 23
	Medical Illustration	- 9
	Medical Record Science	- 27
	Medical Technology	- 28
	Radiologic Technology	- 31

CASE STUDY "D"

Faculty: 1969-70

Department	Full-time Equivalents
Medical Technology	5.25
Medical Illustration	2.50
Medical Record Science	3.20
Radiologic Technology	2.75
Dental Hygiene	3.25
Total	16.95

These data do not include faculty members who participate in certain courses (anatomy and physiology, psychology, etc.)

Students: 1969-70

Department	Number	
Medical Technology	28	
Medical Illustration	9	
Medical Record Science	27	
Radiologic Technology	31	(Includes 15 students enrolled in
Dental Hygiene	23	two-year certificate program)
Total	118	

Calendar System

Department	No. of Quarters
Medical Technology	4
Medical Illustration	3
Medical Record Science	3
Radiologic Technology	4
Dental Hygiene	3

III. Expenditures For Entire Institution.

A. The period of this report is from July 1, 1969 to June 30, 1970.

B. The Institution has not developed or participated in a cost study that would establish cost centers for the cost of educational programs.

C. See B (above).

D. The Institutions reports expenditures under the following categories:

GENERAL ADMINISTRATION AND STUDENT WELFARE

General Administration
- President
- Vice President
- Vice President and Treasurer
- Vice President for Medicine, and Dean, School of Medicine
- Budget Division
- Comptroller
- Management Services
- Personnel
- Procurement

General
- Computer Center
- Institutional Relations
- Communication Services
- Print Shop
- Faculty and Staff Benefits
- General Institution

Student Affairs

Plant Operations

Library

INSTRUCTION, RESEARCH, AND PATIENT CARE

Instruction, Research, and Patient Care
- Health Communications
- Educational Research and Development
- Hospital Research and Development
- Program in Hospital and Medical Systems
- Research Coordination
- Vivarium

School of Allied Health Sciences
- Dental Hygiene
- Medical Illustration
- Medical Record Science
- Medical Technology
- Radiologic Technology
- Occupational Therapy
- Physical Therapy

School of Dentistry
- Administration
- Oral Pathology
- Oral Biology - Anatomy
- Oral Biology - Biochemistry
- Oral Biology - Microbiology
- Oral Biology - Pharmacology
- Oral Biology - Physiology
- Pedodontics
- Periodontics
- Orthodontics
- Oral Medicine
- Oral Medicine - Radiology
- Prosthodontics
- Removable Prosthodontics Lab
- Restorative Dentistry
- Oral Surgery
- Community Dentistry

School of Graduate Studies

School of Nursing

School of Medicine
- Dean's Office
- Basic Sciences
  - Anatomy
  - Biochemistry
  - Microbiology
  - Pharmacology
  - Physiology
  - Neurobehavioral Sciences
- Clinical
- Anesthesiology
- Clinical Laboratory Medicine
- Community Medicine
- Dermatology

CASE STUDY "D" (Cont.)

School of Medicine (continued)
- Department of Medicine
  - General
  - Biomedical Engineering
  - Cardiology
  - Clinical Endocrinology and Metabolism
  - Gastroenterology
  - Hematology
  - Hemodynamic Laboratory
  - Hypertension
  - Infectious Disease
  - Pulmonary
  - Renal
  - Rheumatology
- Clinical Investigation Unit
- Obstetrics and Gynecology
- Pathology
- Pediatrics
- Psychiatry
- Neurology
- Radiology
- Surgery
  - General
  - Neuro
  - Ophthalmology
  - Oral
  - ENT
  - Orthopedics
  - Physical Medicine
  - Thoracic
  - Urology

Hospital and Clinics
- Administrator
- Admissions
- Housestaff - Residents
- Housestaff - Interns
- Medical Records
- Laboratory Medicine - Director
- Laboratory Medicine - Blood Bank
- Laboratory Medicine - Clinical Biochemistry
- Laboratory Medicine - Hematology
- Laboratory Medicine - Microbiology
- Laboratory Medicine - Endocrinology
- Pharmacy

CASE STUDY "E"

COMMENTS

The following pages are direct abstracts taken from correspondence with the investigator. It touches on some of the problems encountered in considering the problem of cost analysis:

1. Difficulty in deciding on relevant cost centers

2. Difficulty in determining allocation of indirect costs

3. Diffusion of the educational programs for allied health among "upper and lower divisions, arts and sciences, professional courses, basic sciences, and clinical education". At this institution they are "located in three or more divisions of the university, spread from the lower division to the Medical School, and consequently difficult to isolate".

The investigator has provided a list of seven relevant cost centers as they appear to him. However, due to lack of expenditure information for these cost centers, the problem is not pursued further.

Page 70 contains a copy of the categories in the university accounting system. Each page reflects individual programs in allied health. The reports contain data for expenditures as well as budgeted amounts for the categories which are shown in the study.

CASE STUDY "E"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	An urban university located in the North East.
Sponsorship	State-supported .
Organization	A University center of the State University System. The entire University System is under the jurisdiction of a chancellor. Each center has its own president. This center consists of seven academic Faculties: Arts and Letters, Educational Studies, Engineering and Applied Sciences, Health Sciences, Law and Jurisprudence, Natural Sciences and Mathematics, and Social Science and Administration.
Enrollment	22,000 students at this University center
Highest Offering	Doctorate

School of Health Related Professions

Organization	Located in the Faculty of Health Sciences which also contains the Schools of Dentistry, Nursing, Pharmacy, and Medicine. The Faculty of Health Sciences is administered by a provost: the schools are headed by deans. Each department is comprised of one program and is directed by a chairman.
Calendar System	Semester System
Programs	Allied Health Teaching (Certificate, Master's) Animal Laboratory Science (post D.V.M. Master's) Medical Technology (Baccalaureate, Master's) Occupational Therapy (Baccalaureate, Master's) Physical Therapy (Baccalaureate)
Accreditation	Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists

	Occupational Therapy - Council on Medical Education, AMA, in collaboration with the American Occupational Therapy Association Physical Therapy - Council on Medical Education, AMA, in collaboration with the American Physical Therapy Association
Number of Institutions Affiliated for Clinical Training	Not available from college catalog
Faculty	25 Full-time 13 Part-time 3 Research and Grant 100 Volunteer Clinical
Enrollment by Program	Not available from college catalog (260 total count)

CASE STUDY "E"

FISCAL INFORMATION

August 31, 1970

School of Health Related Professions Programs:

Our curriculums at this point include baccalaureate and masters in Medical Technology; baccalaureate and masters in Occupational Therapy; a baccalaureate sequence in Physical Therapy; and an "embryonic" post D.V.M. masters program in the Department of Laboratory Animal Science. We also have a rapidly expanding Department of Health Sciences Education and Evaluation. This department now offers a master of science in Allied Health Teaching (community college level) and a certificate program for allied health teachers in two-year colleges.

Faculty: (For academic 1970-71)

Full time	25
Part-time	13
Research and Grant	3
Volunteer Clinical	100

Enrollment: Estimates for 1970-71	Undergraduate	Graduate
Physical Therapy	67	
Medical Technology	72	5
Occupational Therapy	75	15
Community College Teacher Preparation	(25) (certificate)	
Laboratory Animal Science		1
	214	21

II Cost Centers

After reviewing the various cost centers for other health professions, the value and relevance of this information can be seen. The problem at this university is that it would be extremely difficult to determine the twelve or so relevant items. My opinion may only be a reflection of my lack of experience in this area.

If expenditures for allied health are determined by calculation proportions of the total university's budget; what determines these proportions? Student enrollment would not be an accurate guide to the portion of the university budget for allied health because the expenditures for allied health per student are significantly higher than other divisions. On the other hand, expenditures for other general university services probably could be distributed on a per student basis. The only point here is that if this method of calculating cost centers is used, different weights

have to be used for each item. One of the special problems of applying this method to allied health is that a university program is not as self-contained as a dental or medical program. Over a four-year period students are involved in upper and lower divisions, arts and sciences, professional courses, basic sciences, and clinical education. The problem is that these parts of the curriculum are located in three or more divisions of the university, spread from the lower division to the Medical School, and consequently difficult to isolate. Furthermore, the university curriculum is flexible enough to allow students variable distributions of courses between the divisions mentioned.

The following cost center items (taken from the enclosed material and revised) appear to be relevant for the allied health program at this university:

1. Allied Health Instruction (including clinical education, administration and general operations)
2. Basic Science Instruction
3. Arts and Sciences Instruction
4. Research
5. Federal Training Grants (Income)
6. Public Service
7. General University Expense (library, student services, general administration).

III Expenditures

At this time, expenditure figures for each of the above recommended cost centers is not available. We can provide you with some data on School expenditures.

1.	Allied Health Instruction (clinical education and administration	517,124
	maintenance and operation	68,551
2.	Federal Developmental and Training Grants	246,051
	(tentative commitment)	100,000

I am attempting to fathom out methods to arrive at figures for basic science and arts and science instruction.

I sincerely hope that we will have further interaction on this evaluation of cost analysis. We would like to be able to give you more data and at the same time advance our procedures for cost analysis.

Sincerely yours,

CASE STUDY "E"

October 12, 1970

I have enclosed a standard budget condition report for a small account. It will show you the major budget categories. We also receive a faculty roster for our major departments which shows expenditures for individual positions. The administration of all research and training grants is handled separately by the Research Foundation of the University.

Budget reports are issued for individual projects and budget categories would depend on the type of project.

Sincerely yours,

BUDGET CONDITION REPORT
FISCAL YEAR 1970-71

REPORT BY LINE ITEM (FACULTY ORDER) - AS OF 08/12/70

FACULTY FOR HEALTH SCIENCES

ACCT	LINE	CEC	NAME	ANL FTE	APPROPRIATION	ENCUMBRANCE	EXPENDITURE	FREE BALANCE
	HEALTH RELATED PROF							
90296	HLTH REL PROF-PHYS THER-RMDR							
	77740	0420						
	77764	0430	VACANT					
			SALARIES AND WAGES - TEACHING					
			SALARIES AND WAGES - NON TEACHING					
			SALARIES AND WAGES - TRANSFERS					
			SALARIES AND WAGES - TEMPORARY:					
		2000	UNCLASSIFIED					
		2100	NON-TEACHING					
		2200	STUDENT ASSISTANCE					
		2300	INCONVIENCE PAY					
		2400	TEACHING					
		2500	HOLIDAY PAY					
		2600	OVERTIME					
		2800	HONORARIA					
		2900	PERSONNEL AGENCIES					
			** TOTAL **					
		2700	SALARIES AND WAGES - PENDING					
			CALCULATED SALARIES AND WAGES					
			ALLOCATED SALARIES AND WAGES					
			OVER/UNDER CONTROL					
		3000	MATERIALS AND SUPPLIES					
		4000	TRAVEL					
		5000	CONTRACTUAL SERVICES					
		7000	EQUIPMENT					
			TOTAL - M AND O					
			** ACCOUNT TOTAL **					

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CASE STUDY "F"

COMMENTS

This institution has completed a cost analysis study as part of the Program Cost Allocation in Seven Medical Centers: A Pilot Study. The period covered was July 1, 1969, to June 30, 1970. In distributing faculty time, Faculty Effort Reports were used. Expenditures were reported under:

Salaries
Fringe benefits
Supplies
Travel
Maintenance
Equipment

CASE STUDY "F"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	An urban university located in the North Central part of the United States.
Sponsorship	State-supported
Organization	Consists of one main campus and four two-year branch campuses. The main university is headed by a president who is directly responsible to the Board of Trustees. Each college or school is directed by a dean; departments within the college or school are headed by chairmen. There are 17 colleges and schools in the University.
Enrollment	49,000 students at this campus of the University
Highest Offering	Doctorate

School of Allied Medical Professions

Organization	Located in the College of Medicine which also houses the School of Nursing. The School of Allied Medical Professions is divided into ten divisions, each of which represents one program. The School is run by a director, as is each of the programs. In addition to a director, each program division also has a chairman.
Calendar System	Quarter System
Programs	Circulation Technology (Baccalaureate) Hospital and Health Services Administration (Master's) Medical Communications (Baccalaureate) Medical Dietetics (Baccalaureate) Medical Illustration (Baccalaureate) Medical Records Administration (Baccalaureate) Medical Technology (Baccalaureate, Certificate) Nurse Anesthesiology (Certificate) Occupational Therapy (Baccalaureate) Physical Therapy (Baccalaureate, Certificate)
Accreditation	Medical Dietetics - American Dietetic Association (approved) Medical Records Administration - Council on Medical Education, AMA, in collaboration with the American Association of Medical Record Librarians

Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists
Nurse Anesthesiology - American Association of Nurse Anesthetists (approved)
Occupational Therapy - Council on Medical Education, AMA, in collaboration with the American Occupational Therapy Association
Physical Therapy - Council on Medical Education, AMA, in collaboration with the American Physical Therapy Association

Number of Institutions Affiliated for Clinical Training

Circulation Technology	- 2
Medical Dietetics	- 6
Medical Illustration	- 2
Medical Technology	- 1
Nurse Anesthesiology	- 2
Occupational Therapy	- 34
Physical Therapy	- 35

Faculty Not available from college catalog

Enrollment by Program Not available by program (320 total count)

PROGRAM COSTS

The Total Institutional Cost was $20,190,570. Following are some of the program costs after allocation of expenditures:

ALLIED MEDICAL PROFESSIONS
PROGRAM COST, 1969-70

	Total Cost	Program Cost
Total Cost	$865,092	$865,092
Apportioned Indirect Costs (4.1%)	37,233	
Direct Cost	827,859	
By Cost Center:		
* Graduate Education		$ 11,216
Post Baccalaureate		38,929
Continuing Medical Education		39,794
Nursing Graduate Education		6,921
Research		67,477
Advisory & Community Service		13,841
Patient Services		24,223
Medical Dietetics		261,258
Medical Technology		102,946
Medical Illustration		64,882
Occupational Therapy		104,676
Physical Therapy		109,867
Nurse Anesthesiology		19,032

* Used 1967 Effort Analysis to Allocate Costs to Program

CASE STUDY "F"

FISCAL INFORMATION

Cost Centers

For the purpose of the study, the following cost centers were identified:

COLLEGE OF MEDICINE

Undergraduate Medical Education
* Graduate Education
Post Doctoral Education
* Post Baccalaureate
Post M.D. Education
* Continuing Medical Education
Nursing Undergraduate Education
* Research
Dental Education
* Medical Dietetics
* Medical Technology
* Medical Illustrations
* Occupational Therapy
* Physical Therapy
* Nurse Anesthesiology
Biological Sciences
Orthoptic Education
Other Educational Programs
* Advisory Services
* Community and University Services
* Patient Services

COLLEGE OF DENTISTRY

Dental Education
Graduate Education
Intern and Resident Education
Post Graduate Education
Dental Hygiene Education
Research
Services Teaching Hospital
Services Other Hospital

* Programs that Relate to Allied Medical Professions

PROCEDURES

I. PROGRAM COST SUMMARY NO.1

A. Salaries

College

Medicine	$	
Dentistry	$	(confidential material)
Pharmacy	$	

The largest college cost factor was salaries. Therefore the most important of our program cost finding procedures were those for allocating salary costs to each of the programs.

Salary information was gathered from two sources:

1. The University
2. The University Research Foundation

The University salary information was available on an annual basis by department number, budget account, employee name, and dollar amount. The Research Foundation salary information was available by department number, project number, employee name, and dollar amount on a monthly basis. Each individual was listed as many times as his name appeard on the payroll records and included non-salaried individuals. There were over 4,000 individual salary entries in this study.

Salary information was then keypunched in the following manner:

1. Department number
2. Budget account or research project
3. Employee name
4. Employee title
5. Dollar amount

The cards were checked for accuracy and department listings were prepared. These listings were sent to the respective departments to be checked for accuracy in spelling and verification of the individual working in that particular department.

Faculty Effort Report Forms were prepared from the corrected listings and forwarded to the departments for effort reporting. We prepared one form per individual. In cases where individuals appeared in more than one department, the department which furnished the majority of the salary was considered the primary department. A

duplicate of the form with percentage effort was placed in the secondary department file.

The Faculty Effort Report Forms were completed and returned within six weeks. After verifying for 100% effort allocation, the names were checked off our departmental master list. A computer program was designed by our Systems Research Department for allocation of salary costs to the medical center programs. The program totals with percentages were transferred from data processing printouts to Summary No.1.

Some of the problems in gathering salary information:

1. Volume of names to transfer to worksheets
2. Employee not working for department on records. The department did not inform the payroll department of nonsalaried employee changes.
3. Research Foundation records were inconsistent in recording names from month to month.

It is our recommendation that if this type of study is to be repeated annually or periodically the University and the Research Foundation should have a program or system to report each individual's salary by source of funds.

B. Department Administrative Services Program

Each department included a program for administrative services. We allocated the total of this service program to all remaining programs within the department by salary percentage distribution. (Exception: Department 900 Administration will be discussed in II. Summary No.2).

C. Donated Services

Each department was furnished with a list of nonsalaried individuals from the department master list. This list was verified by the departments and amounts were assigned for their services. This voluntary service cost was recorded as a <u>direct</u> expense.

D. Department Equipment

A departmental equipment usage or depreciation cost was computed at 6-2/3 percent of book value. Book value information was taken from the financial statement of the University. We disregarded any equipment purchased within the department.

E. Research Foundation Equipment

We used the actual equipment purchased by and for the Research Foundation's projects. All of the research equipment purchases were allocated to the research program.

F. Other Direct Expense

Other direct expense was allocated to programs on percentage of total salaries. It should be noted that the method we used to allocate direct expenses, while not the most accurate, was the most practical.

Comment - At a meeting with the Chairman of Allied Medical Professions, we discussed direct expense allocation. He expressed that while this was a way it was not the most accurate approach. He felt that the correct way of allocating direct expenses was to go through the requisitions and allocate all direct expenses to appropriate programs. Due to the present accounting system at the University this would have been an impossible task for the 22 departments in the study.

II. PROGRAM COST SUMMARY NO.2

This summarizes the departmental direct expense developed in Summary No.1. We allocated the administrative services from the Service Department of the entire College of Medicine on a direct expense basis.

III. TOTAL PROGRAM COST SUMMARY 2-A

Summary 2-A is a listing of the College programs with the direct expenses from Summary No.2 and the indirect expenses from the overhead rate study. The indirect expenses were allocated to the programs on the direct expense basis.

A. Indirect Expense

The following indirect expense breakdown follows the University overhead rate study:

A. Administration and general expense Research Foundation
B. Building usage
C. Workmen's compensation
D. Physical plant expense
E. Administration and general expense excluding Research Foundation
F. Library expense
G. Student services

Exception - We did not use this procedure for Equipment Usage, Indirect Departmental Expense, or Land Improvements. Equipment Usage and Indirect Departmental Expense was treated as direct expense. The amount of Land Improvements was insignificant.

B. Comments on Overhead Rate Study

The principles of this study are designed to provide recognition of the full allocated cost of such research work under generally accepted accounting principles. The successful application of these principles requires development, mutual understanding between representatives of universities and of the federal government as to their scope, applicability, and interpretation. The arrangements agency and institutional participation in the financing of a research and development project are properly subject to negotiation between the agency and the institution concerned in accordance with such government-wide criteria as may be applicable.

The definition of indirect costs are costs that are not readily identifiable with specific goods or services. Therefore, indirect costs or expenses are estimated or individual judgments.

CONCLUSIONS

To Define Programs

The educational function of medical education extends well beyond the important mission of preparing your men and women for the practice of medicine. The College of Medicine has agreed that medical education is a "continuum" and that the modern medical faculty today must assume responsibility for each of the following:

a. Professional medical education leading to the Doctor of Medicine degree.

b. Postdoctoral medical education (intern, resident, fellow, trainee).

c. Graduate education in the medical sciences (Masters and Doctorate programs).

d. Continuing medical education - designed to meet the requirements of the practicing physicians.

The "continuum" must be a planned, progressive, integrated program that should cultivate self-motivated learning and creativity. The College of Medicine has devoted more time and study to its total educational program than any other group on the campus and has introduced a number of new and innovative programs into its curriculum.

To Define Program Cost

Along with this program of intensive self-study is a need to identify the cost of these medical education programs. For the reasons stated by Augustus J. Carroll in A STUDY OF MEDICAL COLLEGE COSTS:

a. It should give all levels of management a better understanding of medical education costs.

b. It should make possible more meaningful reports for public information.

c. It should facilitate the justification of medical education budgets.

d. It should provide basic planning information for new medical education programs.

Relationship of Program Beneficiary and Program Cost

"Fundamental to an understanding of accountability is the principle that the cost of each medical center program should be paid either by, or for, the beneficiaries of each program".

Each medical center should continuously strive to reach this difficult goal of the beneficiary paying his share. The first step - the knowledge of where our medical center is in relationship between program cost and program support.

Comparability

No matter how desirable comparability is, all medical centers are NOT alike in organization, in philosophy, in methods used by the medical staff; therefore, in order to get meaningful results each medical center must adopt accounting principles that are appropriate for its organization.

The University Hospital is a department in the College of Medicine. In this study, we eliminated all professional staff support from the hospital programs because the salaries were included in other College of Medicine Departments.

Principal obstacle to comparability has been the application of alternative accounting principles to similar sets of facts. The desire of this study should be to emphasize the common goal of eliminating unjustified variances and thereby achieve a maximum degree of comparability of program costs of similar medical centers.

CASE STUDY "G"

COMMENTS

At the time the Cost Advisory Group embarked on its exploratory efforts, this Institution was already devising a method for determining costs of allied health educational programs. The effort was initiated by a Vice-President of the University, who wished to compare the cost of allied health educational programs in a number of schools attached to medical centers. Consequently, it was agree that this institution would not pursue another cost analysis for the present report, but that whatever information was made available from the on-going effort would be incorporated in this report. The following passages represent the contributions from this source.

It is evident from page 86 that actual expenditures were used rather than budgeted figures.

Page 87 suggests some of the problems which are encountered in cost analysis. This summary sheet indicates that at this institution virtually all indirect costs are to be found in the University expenditures rather than in the College expenditures. This implies that a considerable amount of study will be required to allocate the relevant expenditures back to the appropriate college.

Page 88 is indicative of the care which is needed to make sure that all expenditures are considered for inclusion or exclusion, based on some rational decisions.

Page 89 illustrates the detail in which expenditures are identified in the accounting system at this University.

At present, there are no results available from the Inter-institutional study. We have been unable to obtain copies of the forms, and little additional information can be porvided. In telephone conversations, the investigator offered the following observations:

1. He feels that it is mandatory to use the concept of Full Time Equivalent (F.T.E.) Student because of the large number of part-time students.

2. For his purposes, it is sufficient to use the following cost eenters:

   Undergraduate education
   Graduate education
   Professional (post-doctoral) education

3. The investigator feels that the method described in

Program Cost Allocation in Seven Medical Centers - A Pilot Study allows too much latitude to permit comparisons between institutions. On the other hand, when one tries to standardise the procedures sufficiently to permit comparison of the results, a great number of arbitrary decisions and special sample studies are needed.

4. The investigator feels that in some instances, the conversion of existing financial information to comparable classifications requires so many assumptions that the end-product is invalid. The investigator has abandoned cost analysis studies in several institutions on his original list for this reason.

CASE STUDY "G"

INSTITUTIONAL CHARACTERISTICS

Geographic Description	An urban University located in the South.
Sponsorship	State-supported
Organization	Headed by a president who is responsible to the Board of Trustees. The sixteen colleges and schools of the university are administered by deans; the departments operate under the direction of chairmen. In addition to its own schools and colleges, the University considers sixteen two-year community colleges as part of its institution.
Enrollment	24,000 students at the senior college campus.
Highest Offering	Doctorate

College of Allied Health Professions

Organization	Part of a Medical Center, which also includes the Colleges of Medicine, Nursing, Pharmacy, and Dentistry, and University Hospital. The College of Allied Health Professions is supervised by a dean. Each of its programs forms a department with its own chairman.
Calendar System	Semester System
Programs	Clinical Pastoral Counseling (Master's) Clinical Nutrition (Master's) Community Health (Baccalaureate, Master's) Dental Hygiene (Baccalaureate) Medical Radiation Dosimetry (Master's) Medical Technology (Baccalaureate) Physical Therapy (Baccalaureate) Radiological Health Specialty (Master's)
Accreditation	Clinical Pastoral Counseling - Association for Clinical Pastoral Education Dental Hygiene - Council on Dental Education, ADA Medical Technology - Council on Medical Education, AMA, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technologists

	Physical Therapy - Council on Medical Education, AMA, in collaboration with the American Physical Therapy Association
Number of Institutions Affiliated for Clinical Training	Not available from college catalog
Faculty	Not available from college catalog
Enrollment by Program	Not available from college catalog

SELECTED INFORMATION FROM ANNUAL MEDICAL SCHOOL QUESTIONNAIRE

PART I

Items:		Allies Health Actual Expenditures 1968-69
13	Total Expenditues for "Sponsored" College Programs (add lines 3,8,9,12)	# 59,178.12
14	Expenditues from remaining College budget	213,434.45
16	Administrative, Building and Grounds, Library and other medical college costs paid by the University but not included in line 14.	— 0 —
17d	Total Service Funds	— 0 —
17j	Total Other Funds	35,752.95
17k	Total Funds	35,752.95
18	Total Expenditues for Regular ~~Medical~~ College Programs	249,187.40
22	Total College Costs Plus Sponsored Programs but Excluding Teaching Hospital and Clinic Costs	308,365.52
34	Total Income Related to College Programs	94,931.07
45	State Appropriations (if any)	213,434.45
1	Expenditues for operation of hospital and/or dispensary owned by the medical college	— 0 —

2 Current Budget	1968-69	
	Sponsored Programs Budget	Regular Operating Budget
Academic Salaries	34,340	149,484
Other salaries, supplies and expense	24,838.12	99,703.40
Total Operating Budget	# 59,178.12	249,187.40

Name of University _____

Name of College/School/Program Allied Health Professions

I. Data on Total Expenditures related to above college/school/program

A. Actual expenditures for all purposes for 1968-69 yr. $[illegible] (Including expenditures from grants and income sources) Item 22 of Annual Medical School Questionaire.

B. Budgetary interrelation with parent University or MC:

1. Show where expenditures are budgeted for functions:

	College Budget	Univ. Budget
a) Maintenance and operation	$ N C	$ ✓
b) Library	N/A	✓
c) Student services		
Health service	N O	✓
Admissions	N/A	
Other	N/A	
d) Business services		
Purchasing		✓
Accounting		
Telephone		
Personnel		
Insurance (incl. prof. liability)		
e) Equipment, renovation, depr.	✓	
f) Fringe Benefits		✓
g) Communications services		
Public relations		✓
Printing		✓
T.V.		✓
h) Debt service		✓
i) Other major items (Specify) (review list of central services)		

C. Budgetary interrelations with Hospital (s)

1. Show where compensation is budgeted or provided for:

	College Budget	Hospital Budget	Other Sources (Specify)
a) Hospital based faculty Pathology Radiology Anesthesiology Other			
b) House staff	15,120		
c) Faculty in grant supported activities conducted in hospital (e.g., clinical research center)			

2. Determine other expenses involving support provided/recieved by the college to/from other budgetary units or agencies. (specify)

D. Check to find any other major expenditures that should be excluded/included in comparison with University expenditures for total program of the college.

UNIVERSITY

UNIT BUDGET

CASE STUDY "G" (Cont.)

1970-71

1 OBJECT OF EXPENDITURE	2 69-70 F.T.E.	3 1969-70 BUDGET	4 P.S.G.	5 70-71 F.T.E.	6 1970-71 BUDGET
FACULTY					
GRAD ASSIST					
CLASSIFIED					
TECHNICIANS					
RESEARCH ASSOC					
OTHER PERS SERV.					
STUDENT					
SUB TOTAL *					
OTHER					
TRAVEL					
PRINTING					
SUB TOTAL *					
TOTAL * * *					

35709 - REDINGHAUS BUSINESS FORMS

Section III

REVIEWS OF OTHER COST STUDIES

Section III
Reviews of Other Cost Studies

Studenski, P.: Costs and Financing of Higher Education. A Report to the Temporary Commission on the Need for a State University. Legislative Document No.34 (1948) Albany, New York.

This report was prepared at a time when New York State was assessing its efforts in the area of higher education. Of particular interest are the methodologic considerations in unit costs (costs per student) which were explored to analyze the problem.

1. Use of full-time equivalent students and faculty
2. Allocation of indirect costs, e.g., library services (on a per student basis), plant operation (on a floor-space basis).
3. Value of university plants and equipment
4. Value of residence halls.

The report contains a special section relating to Schools of Medicine, Dentistry and Nursing. A school of medicine is recognized to be the most expensive of all of the university schools to maintain because of low enrollment, expensive plant and equipment, large and highly trained faculties, and the need for a hospital affiliate. Of particular difficulty in analyzing these costs are:

1. Inclusion of hospital costs at some universities, and the varying proportion attributed to each at different universities.
2. Services provided by outside practitioners without remuneration.
3. Financial arrangements for research.

The following expenditures were considered in relation to the medical school, and are described in the publication:

1. Administrative costs for the university
2. Library costs
3. Operation and maintenance costs
4. Value of medical plant

Mertens, P.F., and Thomas, L.D.: Student Credit Hours and Direct Costs in the Schools and Colleges of the University of Michigan, Fall Term 1966-67. Ann Arbor, The University of Michigan, 1967.

This paper represented the eighth in a series of annual reports designed to explore the quantitative aspects of instruction at the University of Michigan. All reports attempted to determine instructional costs per student credit hour.

The 1966-67 report analyzed the instructional costs per student credit hour and per full-time equivalent teaching during the fall term. The faculty member's salary for that term was distributed to each course he taught in propcrtion to the percentage of his time spent on activities related to that course. The amount of his salary represented by that course was then divided by the number of student credit hours represented (example: 3 credit course with 50 students = 150 student credit hours). The figure obtained represents the cost per student credit hour. Other direct costs were allocated to the courses on the basis of the represented proportion of the faculty member's time, yielding total cost per student credit hour.

An interesting note is that this method shows how instructional costs are often a function of class size; hence, the smaller the class, the more expensive the instruction. This explains, to a large extent, the high cost of graduate education.

Carroll, A.J.: Study of Medical Education Costs. Syracuse, State University of New York, Upstate Medical Center, 1957.

The study of medical education costs conducted by Augustus J. Carroll on behalf of the State University of New York (SUNY) was undertaken to provide a guide for the planning and administration of SUNY's two medical centers. The facts, figures, and observations in the study are the result of Mr. Carroll's personal interviews with the administrators and financial officers from the nineteen participating medical colleges, including nine private schools and ten state schools.

A recurrent theme in the study revolves around whether or not the cost figures received in a study such as this can be compared between participating schools. Mr. Carroll reported that apprehension about this type of comparison was expressed a number of times throughout the interviews, especially on the part of higher cost, well-established schools who feared that comparisons might be inappropriate or misleading. The concern of the schools was valid as was evidenced by the fact that there was a complete lack of uniformity in the medical colleges' accounting practices. This type of uniformity is essential in making comparisons.

Also contributing to the difficulty in comparison of data were the situational differences between the schools. There may be many reasons for obviously high-cost medical education programs, or obviously low-cost programs. Carroll listed thirty five possible factors which could be considered from this point of view:

Reasons for High Medical College Costs

1. Physical plant is fully developed and in full operation
2. Physical plant and facilities are now being enlarged
3. Facilities are better than average
4. Faculty and plant are temporarily over-expanded (enrollment will be increased when plant expansion is completed)
5. Teaching and research programs are fully developed in most areas.
6. Teaching and research programs are being enlarged and expanded.
7. Leadership in quality of teaching is primary college goal.
8. College supports pioneering and research in medical education
9. College provides basic support for fundamental research by faculty
10. For its clinical teaching program, the college assumes heavy medical service responsibilities in hospitals and clinics
11. M.D. candidate enrollment is high (above 400)
12. College has fully developed full-time departments in most areas.

13. College is located in high salary and high expense area
14. Basic science faculty is paid for 12 months rather than 10 months.
15. Expanding programs necessitate higher faculty salaries, especially for recruitment in the lower ranks.
16. Value of volunteer faculty services is low.
17. College lacks desirable affiliations with psychiatric and other specialty hospitals that provide teaching facilities, faculty and patients at a minimum cost.

Reasons for Low Medical College Costs

18. Physical plant and facilities are inadequate or outdated.
19. Facilities are overcrowded
20. M.D. candidate enrollment is low (under 240)
21. All full-time departments are not fully developed
22. College is located in low salary and low expense area.
23. Basic science faculty is paid on 10 months basis.
24. Annual research and service output of faculty is reduced because of 10 months' work schedule.
25. College depends upon research grants and other university programs to support faculty for two months of each year.
26. College depends importantly upon research grants for technical and secretarial services or scientific equipment, departmental supplies and traveling expenses.
27. College pays lower salaries because of its "prestige".
28. Value of volunteer faculty service is high.
29. College does relatively little pioneering or research in medical education.
30. Instructional budgets are inadequate.
31. Instructional budgets are expected to increase.
32. College has desirable affiliates with psychiatric and other specialty hospitals which provide faculty, teaching facilities, and teaching patients at minimum cost.
33. College is handicapped by limited financial support.
34. College benefits from sponsorship by a religious organization.
35. Supporting staff salaries are low.

To guard against misleading comparisons Carroll considered it imperative to introduce qualifying factors when appropriate. He also suggested that the proposed comparisons be submitted to the chief administrative officer of the medical college for approval before publication.

Beside a full discussion of the problems of inter-institutional cost comparison, the study contains chapters which consider the place of research in medical colleges, the problem of private practice for

medical college faculty, and special aspects of determining clinical facility costs.

A study such as this one has many possible applications within a medical center. Carroll, himself, suggests ten contributions which his study can make to medical centers:

1. It should help the college to avoid impractical faculty salary administrative practices.
2. It should provide reliable guide lines for fixing faculty salaries and for overall budget planning.
3. It should facilitate adoption of an appropriate medical service plan.
4. It should give all levels of management a better understanding of medical education costs and administrative problems.
5. It may help a college to avoid bad administrative practices and policies.
6. It should make possible more meaningful analyses and reports of medical college fiscal affairs for management use and for public information.
7. It may lead to uniformity and improvement in medical education budgeting.
8. It should facilitate more accurate and meaningful cost reporting through the use of program costs.
9. It should facilitate the justification of medical education budgets and the solicitation of funds for medical education.
10. It should provide basic planning information for new medical education programs.

Carroll, A.J., Program Cost Estimating in a Teaching Hospital. (Edited by Thomas J. Campbell and Mary H. Littlemeyer) Washington, Association of American Medical Colleges, 1969

The pilot study of costs in a teaching hospital began in 1962 under the sponsorship of the American Medical Association (AMA), American Hospital Association (AHA), and Association of American Medical Colleges, with financial assistance from the W. K. Kellogg Foundation. After a preliminary investigation, Yale-New Haven Hospital, the major teaching hospital for the Yale University School of Medicine, was chosen as the pilot study site. The hospital alone was the basis for the study -- the medical school itself was not included. Augustus J. Carroll directed the study with the guidance of a 10-man steering committee. Also involved in the study, to varying degrees of participation, were the hospital administrative staff and the hospital department and division heads, numbering over one hundred persons.

The study was initiated to determine the educational costs in the teaching hospital. As it became apparent that educational expenditures involved much more than actual teaching programs, the investigators broadened their scope to include cost analysis of each of the hospital's programs. Their objectives became "to determine the most suitable criteria and procedures for distinguishing the costs of the various hospital programs and to make recommendations that any hospital could use to figure the cost of each of its patient care, educational, research, and service programs."

The fiscal year, October 1, 1963-September 30, 1964 was used as the time frame for the Yale-New Haven study. In certain situations where it would have been impractical to record costs for the entire year, a shorter period of time, perhaps one week, was used to obtain an estimate.

In some cases, the cost of a program to a department was subtle or difficult to determine. Two approaches were used to deal with these situations. In the first approach, the department could use the concept "avoidable costs" - determining what costs could be avoided if the department had no part whatsoever in a particular program, thus arriving at the expenditures incurred as a result of the department having contributed to the program under consideration. The other approach, involving the principle of "replacement costs" was used in estimating the contributions of student help by determining what the cost would be to replace these employees with full-time personnel.

Each of the more than 100 divisions and departments was requested to compute the cost of the 41 program classifications as those programs related to the respective department or division. These 41 classifications became the "cost centers":

PROGRAMS FOR WHICH THE COST WAS COMPUTED

A. Patient Care Programs

1. Care of Inpatients
2. Care of Outpatients
3. Care of Hospital-based Home Care Patients
4. Care of One-Time Emergency Room Visitors
5. Care of Private Outpatients
6. Care of Yale Psychiatric Institute Patients
7. Student Health Services
8. Care of Medical Center Personnel
9. Care of Operating Room Outpatients
10. Care of Clinical Research Center Patients

B. Education Programs

11. Education of M.D. Candidates
12. Education of Interns
13. Education of Residents
14. Education of Postgraduate Fellows
15. Continuing Education for Practicing Physicians
16. V.A. Training Programs
17. Nursing Education - four-year degree program
18. Nursing Education - two-year degree program
19. Nursing Education - three-year R.N. diploma program
20. Nursing Education - Master's degree
21. Nursing Education - L.P.N. Training
22. Nursing Education - In-Service
23. Nurses Aide Training
24. Nursing Administration - Field Work for Columbia University
25. Education of Social Workers
26. Education of Hospital Administrators
27. Education of X-ray Technicians
28. Education of Medical Technologists
29. Education of Operating Room Technicians
30. Education of Inhalation Therapy Technicians
31. Education of Dietary Interns
32. Education of High School Trainees
33. Dietary In-Service Training
34. Dietary Public Health Nutrition

C. Research Programs

35. Hospital Patient Research
36. Medical School Patient Research
37. Hospital Research - not involving patients
38. Medical School Research - not involving patients

D. Community Service Programs

39. Community Service

E. University Service Programs

40. University Service

F. Other Programs

41. Other Programs

Three levels of analysis were feasible upon completion of the study:

1. A total figure was obtained for the expenditures of each program supported by the department. For example, within the broad category of "Patient Care Programs" it was possible to arrive at a total figure representing "Care of Inpatients".

2. The cost per unit of the program could be calculated, i.e., cost per inpatient.

3. It was possible to relate unit-costs of separate programs, for example, the contributed time of a medical education student to the cost of care per inpatient.

The methods for allocating these expenditures were taken from the AHA Chart of Accounts for Hospitals. * Minor variations in accounting procedures were introduced when a special situation occurred for which the Chart of Accounts made no provision. The theory of cost finding for a hospital program whcih evolved from the application of the AHA accounting procedures is represented by the project report to be the following:

> Actual dollars of hospital expenses, when properly related to facts and statements measuring hospital performance in each area of its responsibility (each of its recognized performance programs), will produce Hospital Program Costs.
>
> [OR]
>
> Total hospital costs + facts of hospital operations and performance + tested program cost finding procedures = Hospital Program Costs

*American Hospital Association. Chart of Accounts for Hospitals. Chicago, The Association, 1966.

In the report of the Yale-New Haven project, no mention is made of the financial support required to conduct the study. The duration of the project, however, provides some indication of the size of the undertaking. As was previously mentioned, the study began in 1962. The final report was published in 1969. Part of this delay would certainly be attributed to Mr. Carroll's sudden death in 1968, and to the fact that the study was a first-time effort. But even with these factors considered, the evidence suggests that this type of investigation requires significant expenditures of time and manpower.

Campbell, Thomas J.: Program Cost Allocation in Seven Medical Centers: A Pilot Study. Washington. Association of American Medical Colleges, 1969.

The Association of American Medical Colleges (AAMC) and the U.S. Department of Health, Education and Welfare (DHEW) had several objectives in mind when they co-sponsored the pilot study of seven medical centers in 1966. To begin with, agencies (including Federal, State, and local governments as well as private agencies) which funded medical centers were demanding greater fiscal accountability by the medical centers, and cost analysis was seen as the best method to represent medical center expenditures. The sponsors also wanted to unify and simplify the methods of cost analysis in use by medical centers. The centers themselves realized the value of cost studies in analyzing education budgets, in analyzing financial trends in education, and in evaluating educational programs in terms of cost to the institution.

Study participants included the following medical centers:

Bowman-Gray School of Medicine and
North Carolina Baptist Hospital
University of Iowa Health Science Center
Jefferson Medical College and Medical Center
University of Michigan Medical Center
New York University Medical Center
Ohio State University Medical Center
University of Utah Medical Center

Four broad cost categories were designed for financial analysis by the seven institutions: Patient Care Programs, Education, Research, and Community Service Programs. These could be considered the cost centers, though each of these areas was subclassified by the institutions as the medical centers found it necessary to do so.

Each medical center in the study was asked to use the above mentioned categories in allocating direct and indirect costs, in the development of cost-sharing procedures, and in the application of effort reports to account for faculty and staff time. Their complete reports were to include the following:

1. Definition of each medical center program and identification of its cost
2. Identification of the various sources of financial support for each program.
3. Computation of the financial loss or gain for each program
4. Identification of beneficiaries of each program and the extent to which they have paid for the benefits which they received
5. Identification of the impact of other activities on those programs considered to be the main objectives of the institution.

A manual of procedures was provided for each of the participants; however, the manual was seen to be only a guideline and the medical centers were not bound to any rigid restrictions on the approaches they used when allocating costs. Hence, a variety of approaches are evident in viewing the reports for the seven medical centers. For this reason, it is difficult to compare the actual data of the centers. However, some general observations can be made.

In the area of Educational Programs, each faculty and staff member was asked to allocate his time between the various programs with which he may have been concerned during the course of the year, and salaries could be allocated proportionately. Supplies and other expenses were allocated directly, where possible. When it was not possible to allocate these items directly, they were assigned in proportion to staff salaries, since supplies which were used generally had a direct relationship to the number of personnel in a given area.

Patient Care Programs proved one of the most difficult areas to analyze financially, because the teaching hospital usually involved in this area provided complications. Most of the hospitals associated with the medical centers used the step-down method for allocating their expenditures. When this method was combined with the allocation of medical center staff salaries to teaching efforts, the resulting figures accounted for the majority of funds involved in the education of students in a teaching hospital.

Cost analysis of research in medical centers included all research activities, regardless of how they were financed. Participants recommended that future students be confined to research activities where personnel were able to identify their time easily, instead of concentrating on every research activity, where many personnel might have spent minute periods of time. All the centers were able to identify the amount of time their personnel spent in advisory services to agencies involved in research.

Community Service Programs did not account for a substantial amount of medical center funds but were considered to be of great importance to the medical centers in terms of long-range planning.

It might be of interest to note that two Schools of Allied Health were included in the seven medical centers; however, these schools did not contribute to the study in terms of actual data. The pilot study report states:

> The Schools of Allied Health Sciences which participated were still in the development stage. They participated primarily to learn the methods for developing program costs. In the future, the experience gained by these schools should prove beneficial in developing program costs for the various allied health professions.

The pilot study of the seven medical centers represents a considerable investment in terms of financial support, time, and manpower. It took a year to collect the financial data from the centers, a year to analyze the data, and another year until the report was published. With financial help from the W.K.Kellogg Foundation, a full-time person was employed in each of the medical centers to conduct the study. The sum of $14,000 was given for the support of the full-time individual in each medical center. The estimates of the seven medical centers of the total cost of the study ranged from $18,600 to $40,000, with an average estimate of $30,000 per medical center.

Norwood, G.M., Jr. (ed.): Cost Study of Dental Education. Chicago. The American Association of Dental Schools, 1965.

The study on costs of dental education began in 1962 when the American Association of Dental Schools (AADS) attempted a pilot study of six dental schools to determine whether or not Augustus Carroll's work in costs of medical education would be applicable to dental education costs. A manual of procedures based on Carroll's approach was used by the six schools in the pilot study.

Because the dental schools records were complete and precise, it was possible for them to apply a uniform set of costing procedures to their financial data. The following cost centers, used by all participating institutions, were agreed upon before the study was implemented:

1. Dental Education: for D.D.S. or D.M.D. degree
2. Graduate Education
3. Intern and Resident Education
4. Postgraduate Dental Education
5. Education for Medical Students
6. Education for Dental Hygienists
7. Education for Dental Technicians
8. Education for Dental Assistants
9. Education for Public Health Students
10. Research
11. Advisory Services
12. Services to Teaching Hospital
13. Services to Other Hospitals, Clinics, Institutions, Dentists
14. Community and Public Services
15. Other Programs

The advantage of using uniform costing procedures and uniform cost centers was that the data could be compared between the participating institutions.

After each school's expenditures were allocated to the respective cost centers, the data were considered in four parts:

1. A breakdown was made of the total expenditures of the school among the cost centers used.
2. Each school's total income was tabulated by source.
3. Net cost of each program was calculated by comparing the cost of the program to the income for that program.
4. Unit costs of the program were determined per full-time student.

The success of the pilot study encouraged the AADS to repeat the study during fiscal year 1963-64 on 45 dental schools throughout the United States and Canada. The cost centers and accounting pro-

cedures employed by the pilot study were repeated in the enlarged effort, with similar success.

The published report of both studies contains a number of recommendations for future cost analysis efforts in dental education. Among them was an emphasis on the need for cost analysis on a continuing basis utilizing uniform accounting procedures. The recommendations also call for more uniformity in the terminology of course designations and department identifications to facilitate the comparison of data on a national level.

These two recommendations would appear to pinpoint the key to a successful cost analysis in any type of venture.

Knott, L.W., Vreeland, E.M., and Gooch, M.: Cost Analysis for Collegiate Programs in Nursing, Part I, Analysis of Expenditures, New York. National League for Nursing, 1956.

_____: Cost Analysis for Collegiate Programs in Nursing, Part II, Current Income and Other Resources. New York. National League for Nursing, 1957.

In this particular effort, the National League for Nursing (NLN) attempted to develop a practical model of cost analysis which would be applicable to any collegiate nursing programs for which an analysis of expenditures was desirable. The publication represents a manual of procedures, rather than an actual case study.

The manual develops 15 cost centers for a hypothetical university. The cost centers are felt to be relevant to most collegiate nursing programs:

1. Operation and maintenance
2. General institutional expense
3. General administration
4. Auxiliary enterprises
5. General library
6. University hospital
7. Other organized activities
8. Student aid
9. Student services
10. Arts and sciences
11. Nursing education
12. All other organized units of instruction
13. Organized research
14. Extension and public service
15. Maintenance of the religious (when applicable)

Expenditures, under the NLN proposal, are allocated to the cost centers by the step-down method. The cost centers are arranged in such order that the department which renders the greatest service to the others, but which receives the lowest proportion of benefits from the others, appears first in the arrangement. As the listing of cost centers proceeds, a gradual shift is perceived in the relationship between the proportion of services rendered and benefits received, until, at the end of the arrangement appears the cost center which renders the least amount of services in proportion to the benefits it receives. As expenditures from the first cost center are allocated to all other departments which it serves, that first center is considered closed, and so on down the line until all such expenditures are allocated to the departments representing the primary cost centers (those appearing at the end of the arrangement).

This publication has formed the basis of a number of succeeding studies. Its contributions are seen both in terms of methodology and in the establishment of a proposed uniform classification of cost centers for collegiate nursing education.

Rowe, H., and Flitter, H.: Study on Costs of Nursing Education, Part I, Cost of Basic Diploma Programs. New York. National League for Nursing, 1964.

_____: Study on Costs of Nursing Education, Part II, Cost of Basic Baccalaureate and Associate Degree Programs. New York, National League for Nursing, 1965.

The purpose of the studies conducted by Rowe and Flitter was to apply the cost analysis model of Knott, Vreeland and Gooch to actual programs in nursing education. Ten institutions were chosen for the Rowe and Flitter effort, some offering diploma programs and others offering degree-level programs.

Both types of programs were analyzed by the step-down method of allocating costs. There was a difference in the cost centers designated the two types of programs, but this was to be expected because of the inherent differences between the two approaches to nursing education. The physical settings of the programs alone (hospital vs. university) would suggest that special adaptations were needed with respect to cost centers.

DIPLOMA PROGRAMS

Diploma program expenditures in the Rowe and Flitter study were accommodated within fourteen cost centers:

A. Staff Benefits
B. Health Service
C. Operation and Maintenance of Physical Plant
D. Administration and General Expense
E. Laundry
F. Housekeeping
G. Dietary
H. Employee and Student Nurse Residence
I. Library
J. Maintenance of the Religious (when applicable)
K. Nursing Education: Noneducational Functions
L. Nursing Education: Educational Functions
M. All Other Hospital Functions
N. Use Value of Buildings (not allocated as a cost)

In applying the step-down method, cost centers "A" through "I" were considered as overhead cost centers and were allocated, in turn to the cost centers "J" through "M", the latter being considered primary cost centers.

The authors summarized the basis for allocation of each overhead cost centers as follows:

Cost Center		Basis for Allocation
A.	Staff Benefits	Proportion of total salaries and wages occurring in each cost center
B.	Health Service	Proportion of total health service visits made by persons in each cost center or proportion of total number of eligible persons occurring in each cost center.
C.	Operation and Maintenance of Physical Plant	Proportion of total square footage in each cost center
D.	Administration and General Expense	Proportion of total direct expenses occurring in each cost center
E.	Laundry	Proportion of total man-hours involved in washing and finishing laundry devoted to laundry sent by each cost center and/or proportion of total poundage sent by each cost center.
F.	Housekeeping	Proportion of total square footage serviced by housekeeping occurring in each cost center.
G.	Dietary	Proportion of total meals served to persons in each cost center
H.	Employee and Student Nurse Resident	Proportion of total rooms reserved for persons in each cost center or proportion of total weeks of occupancy occurring in each cost center
I.	Library	Proportion of total usage of library by persons in each cost center.

BACCALAUREATE AND DEGREE PROGRAMS

Seventeen cost centers were required to account for the expenditures of associate and baccalaureate degree programs. As was mentioned earlier, some differences are noted between these cost centers and those for diploma programs. For example, the diploma cost center "employee and student nurse residence" does not appear in the degree program centers because of the basis difference between hospital and university programs. Whereas a hospital-based diploma program includes student housing as part of its program costs, a university is likely to include these expenditures under "auxiliary enterprises", and this latter classification is generally thought of to be self-supporting.

The seventeen cost centers designated for associate and baccalaureate programs were:

1. Staff Benefits
2. Operation and Maintenance of Physical Plant
3. General Institutional Expense
4. General Administration
5. General Library
6. Student Services
7. Auxiliary Enterprises
8. University Hospital
9. Other Organized Activities
10. Student Aid
11. Arts and Sciences
12. Nursing Education
13. Use Value of Buildings
14. All Other Organized Units of Instruction
15. Organized Research
16. Extension and Public Service
17. Maintenance of the Religious

Of these cost centers, the first six were considered to be overhead cost centers, and they were apportioned to the remaining eleven primary cost centers by the step-down method on the following basis:

Cost Center	Basis for Allocation
Staff Benefits	Proportion of the sum of the salaries and wages occurring in each subsequent cost center.
Operation and Maintenance of Physical Plant	Proportion of the sum of the square footage occurring in each subsequent cost center (adjusted for usage when applicable)
General Institutional Expense	Proportion of the sum of the direct expenses in each subsequent cost center
General Administration	Proportion of the sum of the direct expenses occurring in each subsequent cost center.
General Library	Proportion of the sum of the credit-hours or the number of eligible students occurring in each subsequent cost center.
Student Services	Proportion of the sum of the number of eligible students occurring in each subsequent cost center.

Tennessee Higher Education Commission: The Cost of Collegiate Nursing Education in Tennessee. Nashville, The Commission, 1969.

The Tennessee study on costs of nursing education was conducted during the fiscal year 1967-68 in an attempt to determine the cost of establishing new collegiate programs in nursing and to determine the cost of maintaining on-going programs. It was hoped that the results of the study would provide some indication as to whether the shortage of nurses in the State could be better approached by expanding existing programs or initiating new programs. The study was undertaken to obtain a financial profile of each school, rather than for the purpose of comparing schools.

Eight institutions participated in the study. They represented both associate and baccalaureate degree programs. Some were new programs, other had been operational for several years. Each school attempted to project the total education costs for nursing by inclusion of both nursing and non-nursing curriculum costs.

The step-down method was the main tool for allocating costs. Eighteen cost centers were designated:

1. Staff benefits
2. Other expenses
3. Maintenance and operational
4. General institutional
5. General administration
6. Auxiliary enterprises
7. Library
8. University hospital
9. Other medical expenses
10. Other organized educational activities
11. Student aid
12. Student services
13. Expenses related to instruction
14. Areas nurses take courses
15. Nursing
16. Other organized units of instruction
17. Organized research
18. Extension and public service

These classifications of direct expenses were allocated to each of the cost centers: salaries and wages, supplies and expense, and capital expenditures.

The study report does not indicate what decisions, if any, were made about nursing education in Tennessee on the basis of the cost analysis. Perhaps the most significant contribution of the report is the clear visual representation of the step-down method of allocating costs given in each institution's financial profile.

Section IV

MEDLARS DEMAND SEARCH

GUIDE TO UNDERSTANDING YOUR MEDLARS DEMAND SEARCH

The search formulation contains a list of terms consisting of medical subject headings judged to relate to a given search request. The Search Analyst selects them from the MEDLARS controlled vocabulary, Medical Subject Headings (MeSH). It is important to understand that terms outside the MEDLARS vocabulary, even if they appear in the titles of relevant articles or in the requester's own statement of requirements, cannot be used to retrieve the biomedical literature indexed for MEDLARS.

Index terms assigned by Medical Literature Analysts, as well as various other citation elements (e.g., LANGUAGES, JOURNAL TITLE ABBREVIATION, YEAR OF PUBLICATION, etc.) are represented on the search formulation by element symbols, or letter-number combinations, e.g., M1, M5, S3, L1, X2, etc.

Searching in MEDLARS is based on the principle of coordinate indexing; that is, a citation to an article qualifies for retrieval if the assigned terms and citation elements associated with that article match exactly the terms and citation elements in the search formulation. However, the match depends not only on the terms and citation elements themselves, but also on their presence in specific logical combinations culminating in the request statement(s) at the bottom of the search formulation. The request statement is a symbolic expression of the search question as translated from the requester's stated requirements into the language of MEDLARS.

INDEX MEDICUS vs. NON-INDEX MEDICUS. All citations indexed for Index Medicus usually appear under at least one and sometimes under up to three or four terms in the printed index, but they may be stored under additional headings for retrieval in demand searches. Thus, a citation may be indexed for retrieval under a particular term in MEDLARS without appearing under that term in the subject index in Index Medicus--the principal MEDLARS publication. Terms assigned to an article by the Medical Literature Analyst are designated as "print" or "non-print," the latter being equivalent to "non-Index Medicus." Those subject headings appearing with a citation in the search printout that are preceded by an asterisk are the headings under which that citation will be found in the printed Index Medicus.

> The element symbol "M" is used for the retrieval of a citation indexed under a given term regardless of whether or not the citation appears under that term in Index Medicus.
>
> The element symbol "T" is used for the retrieval of a citation indexed under a given term provided that the citation appears under that term in Index Medicus.

EXPLOSION. The Search Analyst has access to a coded categorized list of subject headings, which enables him to search on several hierarchically related terms by entering only one element symbol which represents the general term encompassing the other more specific terms in the hierarchy.

> The letter "E" or "e" appearing between an element symbol and its corresponding term indicates an "exploded" term.
>
> > If M1 E HAIR is entered, then M1 means: "Retrieve all citations indexed under HAIR and/or EYEBROWS and/or EYELASHES." These latter two headings are indented under HAIR in the Search Analyst's coded categorized list of subject headings.

SUBHEADINGS. Terms in Index Medicus may be divided by subheadings, so that citations are often indexed under main heading/subheading combinations as well as under main headings without subheadings. It is possible to search for all citations indexed with a particular subheading regardless of the main heading to which the subheading is attached, as well as to search for specific main heading/subheading combinations.

The element symbol "S" is used for the retrieval of a citation indexed under a given subheading.

The element symbol "X" is used for the retrieval of a citation indexed under a main heading/subheading combination.

SUMMATION. Element symbols having a common letter may constitute a summation representing two or more terms or citation elements equivalent to those same terms or citation elements in an "or" relationship.

If M5 = SUM M1 M4, then a request for M5 means: "Retrieve all citations indexed under any of the terms corresponding to M1 through M4."

NON-ALPHANUMERIC SYMBOLS IN THE REQUEST STATEMENT. The "+" and "*" are syntactic devices connecting the terms in logical relationships in the request statement.

The "+" indicates the coincidence of two or more terms in an "or" relationship.

M1+M2 means: "Retrieve all citations indexed under M1 or M2, regardless of the other subject headings which may also have been used to index the article."

The "*" indicates the coincidence of two or more terms in a strictly "and" relationship.

M1*M2 means: "Retrieve all citations indexed under both M1 and M2 together, but do not retrieve any citations indexed under M1 which are not also indexed under M2, nor citations indexed under M2 which are not also indexed under M1."

The third symbol used in the grammar of MEDLARS, the "-," is a negation sign which precedes a term or citation element that the Search Analyst wishes to exclude from the formulation or a portion of the formulation.

THE PRINTOUT. A printout may be divided into one, two or three Sections, each having a corresponding request statement on the formulation. The beginning of each Section is marked on the printout by the Search Analyst. Unless otherwise stated, citations within each Section are arranged alphabetically by the first author.

A citation in a printout having more than one Section is printed only once in the most specific Section for which it qualified, even though it qualified for more than one Section. Of the three Sections possible, the first, corresponding to the third request statement on the formulation, is the most specific, the second more general, and the third the least specific. In a printout having three sorts, a citation which does not qualify for the second Section cannot be considered a candidate for the first Section and will therefore be printed in the third Section.

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REQUEST 1p1750 08/07/70

COST ANALYSIS OF MEDICAL, DENTAL AND NURSING EDUCATION.
SUSAN WEISS
RESEARCH ASSISTANT
ASSOCIATION OF SCHOOLS OF ALLIED HEALTH PROFESSIONS
ONE DUPONT CIRCLE, N.W., WASHINGTON, D.C. 20036

L1 = ALL
M1 = EDUCATION, DENTAL
M2 = EDUCATION, DENTAL, CONTINUING
M3 = EDUCATION, DENTAL, GRADUATE
M4 = EDUCATION, MEDICAL
M5 = EDUCATION, MEDICAL, CONTINUING
M6 = EDUCATION, MEDICAL, GRADUATE
M7 = EDUCATION, NURSING
M8 = EDUCATION, NURSING, CONTINUING
M9 = EDUCATION, NURSING, DEGREE PROGRAMS
M10 = EDUCATION, NURSING, DIPLOMA PROGRAMS
M12 = EDUCATION, NURSING, GRADUATE
M13 = EDUCATION, PREDENTAL
M14 = EDUCATION, PREMEDICAL
M15 = INTERNSHIP AND RESIDENCY
M16 = SCHOOLS, DENTAL
M17 = SCHOOLS, MEDICAL
M18 = SCHOOLS, NURSING
M19 = SCHOOLS, PUBLIC HEALTH
M20 = STUDENTS, DENTAL
M21 = STUDENTS, MEDICAL
M22 = STUDENTS, NURSING
M23 = FACULTY, DENTAL
M24 = FACULTY, MEDICAL
M25 = FACULTY, NURSING
M30 = SUM M1 M25
M31 = COSTS AND COST ANALYSIS
T1 = ECONOMICS
T2 = ECONOMICS, DENTAL
T3 = ECONOMICS, NURSING
T4 = COSTS AND COST ANALYSIS
T5 = FINANCING, GOVERNMENT
T6 = FINANCING, ORGANIZED
T7 = FINANCING, PERSONAL
T8 = TRAINING SUPPORT
T9 = FOUNDATIONS
T10 = SUM T1 T9

SECT.4 L1*T10*M30. 133
SECT.5 M31. 20

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COST ANALYSIS OF MEDICAL, DENTAL AND NURSING EDUCATION. 1=COSTS AND COST ANALYSIS (.22.CITATIONS). 2=ECONOMICS AND EDUCATION (1,3.CITATIONS).

ALLEN EM
FISCAL RELATIONS BETWEEN THE MEDICAL SCHOOLS AND THE FEDERAL GOVERNMENT.
J MED EDUC 43:697-705, JUN 68
*ACCOUNTING, COSTS AND COST ANALYSIS, FACULTY, MEDICAL, *FINANCING, GOVERNMENT, GOVERNMENT AGENCIES, ORGANIZATION AND ADMINISTRATION, RESEARCH SUPPORT, *SCHOOLS, MEDICAL, UNITED STATES (1), UNITED STATES NATIONAL INSTITUTES OF HEALTH

HILL RA
THE COST OF MEDICAL EDUCATION.
BRIT J MED EDUC 2:115-8, JUN 68
*COSTS AND COST ANALYSIS, *EDUCATION, MEDICAL

KAPUR RK
HOW PRIVATE DENTAL EDUCATION CAN SURVIVE.
J DENT EDUC 32:416-9, DEC 68
COSTS AND COST ANALYSIS, CURRICULUM, *ECONOMICS, *EDUCATION, DENTAL, HUMAN (4)

LISAGOR S
WHO SHOULD PAY FOR MEDICAL EDUCATION IN THE HOSPITAL.
CANAD HOSP 45:49-52, NOV 68
CANADA (1), COSTS AND COST ANALYSIS, ECONOMICS, HOSPITAL, *EDUCATION, MEDICAL, *FINANCING, ORGANIZED, *HOSPITALS, TEACHING

MARSHALL D
THOUGHTS ABOUT THE COST OF MEDICAL EDUCATION.
MICH MED 67:572-4, MAY 68
*COSTS AND COST ANALYSIS, *EDUCATION, MEDICAL, HUMAN (4)

OLSON SM
FINANCING GRADUATE MEDICAL EDUCATION.
J MED EDUC 44:745-54, SEP 69
COMPREHENSIVE HEALTH CARE/ EDUCATION, COSTS AND COST ANALYSIS, *ECONOMICS, MEDICAL, *EDUCATION, MEDICAL, GRADUATE, FEES, MEDICAL, *FINANCING, ORGANIZED, FOUNDATIONS, HOSPITAL MEDICAL STAFF, HOSPITALS, TEACHING, INCOME, INTERNSHIP AND RESIDENCY, MEDICAL INDIGENCY, MINNESOTA (1), PHYSICIANS, SCHOOLS, MEDICAL

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PORRIS JE
OBSERVATIONS ON BLOOD-GAS CHANGES, RELATIVE COST AND SUITABILITY OF SIMPLE ANAESTHETIC APPARATUS AND TECHNIQUES USED BY UNTRAINED PERSONNEL.
ACTA ANAESTH SCAND SUPPL 25:259-, 1966
ANESTHESIA, INHALATION, *ANESTHESIA, INHALATION/ INSTRUMENTATION, ANESTHESIOLOGY/ EDUCATION, *ANESTHESIOLOGY/ MANPOWER, *CARBON DIOXIDE/ BLOOD, *COSTS AND COST ANALYSIS, ETHYL ETHER, HALOTHANE, HUMAN (4), METHODS (3), METHOXYFLURANE, NURSES, *OXYGEN/ BLOOD, STUDENTS, MEDICAL

ROME CH
RESOURCES FOR MEDICAL EDUCATION: CURRENT RESOURCES AND FUTURE NEEDS.
ARTHRITIS RHEUM 11:334-42, APR 68
COSTS AND COST ANALYSIS, *EDUCATION, MEDICAL, FINANCING, GOVERNMENT, ORGANIZATION AND ADMINISTRATION, RESEARCH SUPPORT, *SCHOOLS, MEDICAL, *TRAINING SUPPORT, UNITED STATES (1), UNITED STATES NATIONAL INSTITUTES OF HEALTH

SHIRKEY HC
EDUCATING THE DOCTOR ABOUT DRUG COSTS.
CLIN PEDIAT (PHILA) 7:5-6, JAN 68
*COSTS AND COST ANALYSIS/ EDUCATION, *EDUCATION, MEDICAL, HUMAN (4), *PHARMACEUTICAL SERVICES/ EDUCATION, *PHARMACOLOGY/ EDUCATION

TEUSCHER GW
EDITORIAL. THE AMERICAN FUND FOR DENTAL EDUCATION NEEDS YOU.
J DENT EDUC 34:14, MAR 70
COSTS AND COST ANALYSIS, *EDUCATION, DENTAL, *TRAINING SUPPORT, UNITED STATES (1)

WALSH J
MEDICAL SCHOOLS: AT THE CENTER, THE PROBLEM IS UNREIMBURSED COSTS.
SCIENCE 166:726-8, 7 NOV 69
*COSTS AND COST ANALYSIS, *FINANCING, GOVERNMENT, QUALITY OF HEALTH CARE, *SCHOOLS, MEDICAL, UNITED STATES (1), UNITED STATES NATIONAL INSTITUTES OF HEALTH

WARD VS
CONTINUING EDUCATION ON A SHOESTRING.
AMER J NURS 70:330-1, FEB 70
COLORADO (1), *COSTS AND COST ANALYSIS, *EDUCATION, NURSING, CONTINUING, *SOCIETIES, NURSING

(ANONYMOUS)
CAN WE AFFORD SMALL SCHOOLS.
CANAD NURSE 63:48, DEC 67
CANADA (1), *COSTS AND COST ANALYSIS, EDUCATION, NURSING, DIPLOMA PROGRAMS, *SCHOOLS, NURSING

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(ANONYMOUS)
TASK FORCE TO STUDY WASHINGTON U. DENTAL SCHOOL CRISIS.
J AMER DENT ASS 77:1, JUL 68
*AMERICAN DENTAL ASSOCIATION, COSTS AND COST ANALYSIS, CURRICULUM, HUMAN (4), ORGANIZATION AND ADMINISTRATION, *SCHOOLS, DENTAL, *TRAINING SUPPORT

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1968 SURVEY OF DENTAL PRACTICE. I. INTRODUCTION. BUREAU OF ECONOMIC RESEARCH AND STATISTICS.
J AMER DENT ASS 78:127-32, JAN 69
*AMERICAN DENTAL ASSOCIATION, COSTS AND COST ANALYSIS, DENTAL ASSISTANTS, DENTAL HYGIENISTS, DENTAL TECHNICIANS, DENTISTRY/ MANPOWER, DENTISTS, *ECONOMICS, DENTAL, EDUCATION, DENTAL, FEES, DENTAL, HUMAN (4), *PRACTICE MANAGEMENT, DENTAL, QUESTIONNAIRE (3), SPECIALTIES, DENTAL, UNITED STATES (1)

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1968 SURVEY OF DENTAL PRACTICE. XII. SUMMARY. BUREAU OF ECONOMIC RESEARCH AND STATISTICS.
J AMER DENT ASS 79:1202-5, NOV 69
*AMERICAN DENTAL ASSOCIATION, COSTS AND COST ANALYSIS, DENTAL ASSISTANTS, *DENTISTRY, DENTISTS, *ECONOMICS, DENTAL, EDUCATION, DENTAL, CONTINUING, *GENERAL PRACTICE, DENTAL, HUMAN (4), INCOME, UNITED STATES (1)

(ANONYMOUS)
INCREASES SUPPORT FOR AFDE IN 1969.
J AMER DENT ASS 80:748, APR 70
COSTS AND COST ANALYSIS, *EDUCATION, DENTAL, FINANCING, ORGANIZED, *TRAINING SUPPORT, UNITED STATES (1)

(ANONYMOUS)
HARVARD DENTAL DEAN NOTES FINANCIAL PROBLEMS.
J AMER DENT ASS 79:612, SEP 69
COSTS AND COST ANALYSIS, *ECONOMICS, *EDUCATION, DENTAL, *SCHOOLS, DENTAL, *TRAINING SUPPORT, UNITED STATES (1)

(ANONYMOUS)
THE DENTAL SCHOOL CRISIS.
J AMER DENT ASS 77:4-5, JUL 68
COSTS AND COST ANALYSIS, DENTISTRY/ MANPOWER, FACULTY, DENTAL, FINANCING, GOVERNMENT, HUMAN (4), *SCHOOLS, DENTAL, *TRAINING SUPPORT, UNITED STATES (1)

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MEDICAL SCHOOL TUITION LEVELS, 1967-68.
J MED EDUC 43:321-2, FEB 68
*COSTS AND COST ANALYSIS, ECONOMICS, MEDICAL, RESEARCH SUPPORT, *SCHOOLS, MEDICAL, TRAINING SUPPORT

BENNETT IL JR
THE FEDERAL ROLE IN MEDICAL EDUCATION.
ARCH DERM (CHICAGO) 99:332-41, MAR 69
*EDUCATION, MEDICAL, *FINANCING, GOVERNMENT, POLITICS, RESEARCH SUPPORT, UNITED STATES (1)

BRASS A
FOREIGN MEDICAL AID TO SOUTH VIETNAM.
NEW ENG J MED 277:789-93, 12 OCT 67
AUSTRALIA (1), *ECONOMICS, EDUCATION, MEDICAL, HUMAN (4), *INTERNATIONAL COOPERATION, *MEDICAL MISSIONS, VIETNAM (1), WAR, WORLD HEALTH ORGANIZATION

CHAPMAN JE
A COMMON DENOMINATOR IN THE EQUATION TOWARD A MEDICAL EDUCATION.
J AMER MED WOM ASS 24:561-5, JUL 69
*EDUCATION, MEDICAL, *FINANCING, PERSONAL, PHYSICIANS, WOMEN, UNITED STATES (1)

CLARK WS
THE ROLE OF VOLUNTARY HEALTH AGENCIES IN EDUCATION.
ARTHRITIS RHEUM 11:SUPPL:343-5, APR 68
*EDUCATION, MEDICAL, *FOUNDATIONS/ UTILIZATION, *TRAINING SUPPORT, UNITED STATES (1), *VOLUNTARY HEALTH AGENCIES/ UTILIZATION

COHEN WJ
MEDICAL EDUCATION AND PHYSICIAN MANPOWER FROM THE NATIONAL LEVEL.
J MED EDUC 44:12-7, JAN 69
COMPREHENSIVE HEALTH CARE, *EDUCATION, MEDICAL, EDUCATION, MEDICAL, CONTINUING, *FINANCING, GOVERNMENT, HEALTH MANPOWER, PERSONAL HEALTH SERVICES, *PHYSICIANS/ MANPOWER, *STATE MEDICINE

COLE TM, ANDERSON TP, CREWE N
SUMMER FELLOWSHIP IN PHYSICAL MEDICINE AND REHABILITATION FOR MEDICAL STUDENTS.
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*ECONOMICS, NURSING, *EDUCATION, NURSING, INTERNATIONAL COOPERATION, *NURSING, *SOCIETIES, NURSING

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THE NIMH AND MENTAL HEALTH TRAINING IN SCHOOLS OF PUBLIC HEALTH.
AMER J PUBLIC HEALTH 60:227-8, FEB 70
*MENTAL HEALTH/ EDUCATION, *SCHOOLS, PUBLIC HEALTH, *TRAINING SUPPORT, UNITED STATES NATIONAL INSTITUTES OF HEALTH

(ANONYMOUS)
SCHOLARSHIPS AND BLACK STUDENTS IN DENTISTRY.
J AMER DENT ASS 79:613, SEP 69
*EDUCATION, DENTAL, HUMAN (4), *NEGROES, *TRAINING SUPPORT, UNITED STATES (1)

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RESIDENCIES AND FELLOWSHIPS. IN PEDIATRIC SUBSPECIALTIES AND GENERAL ACADEMIC PEDIATRIC TRAINING.
J PEDIAT 76:166-8, JAN 70
*INTERNSHIP AND RESIDENCY, *PEDIATRICS, *TRAINING SUPPORT, UNITED STATES (1)

(ANONYMOUS)
NEGRO STUDENT SCHOLARSHIPS AVAILABLE FOR 1969-1970.
J AMER DENT ASS 78:284, FEB 69
*AMERICAN DENTAL ASSOCIATION, *EDUCATION, DENTAL, HUMAN (4), *NEGROES, *TRAINING SUPPORT

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[illegible] TEACHING TRAINING FELLOWSHIPS.
J [illegible] DENT ASS 70:267-8, FEB 69
*AMERICAN DENTAL ASSOCIATION, *EDUCATION, DENTAL, HUMAN (4), *TEACHING, *TRAINING SUPPORT

(ANONYMOUS)
1968 SURVEY OF DENTAL PRACTICE II. INCOME OF DENTISTS BY LOCATION, AGE, AND OTHER FACTORS. BUREAU OF ECONOMIC RESEARCH AND STATISTICS.
J A M A DENT ASS 70:342-6, FEB 69
AGE FACTORS, *AMERICAN DENTAL ASSOCIATION, *DENTISTS, *ECONOMICS, DENTAL, FACULTY, DENTAL, FEES, DENTAL, GENERAL PRACTICE, DENTAL, GROUP PRACTICE, DENTAL, *INCOME, PARTNERSHIP PRACTICE, STATISTICS, UNITED STATES (1)

(ANONYMOUS)
MEDICAL EDUCATION IN THE UNITED STATES. VII. PROGRAMS IN MEDICAL EDUCATION SPONSORED BY GOVERNMENT AGENCIES.
JAMA 206:2062-71, 25 NOV 68
AVIATION MEDICINE/ EDUCATION, *EDUCATION, MEDICAL, EDUCATION, MEDICAL, CONTINUING, EDUCATION, MEDICAL, GRADUATE, FOREIGN MEDICAL GRADUATES (3), *GOVERNMENT AGENCIES, INTERNSHIP AND RESIDENCY, MILITARY MEDICINE/ EDUCATION, NAVAL MEDICINE/ EDUCATION, NUCLEAR MEDICINE/ EDUCATION, SUBMARINE MEDICINE/ EDUCATION, *TRAINING SUPPORT, UNITED STATES (1), UNITED STATES NATIONAL INSTITUTES OF HEALTH, UNITED STATES PUBLIC HEALTH SERVICE, UNITED STATES VETERANS ADMINISTRATION

(ANONYMOUS)
MEDICAL EDUCATION IN THE UNITED STATES. IV. AMA VIETNAM MEDICAL SCHOOL PROJECT.
JAMA 206:2081-3, 25 NOV 68
*AMERICAN MEDICAL ASSOCIATION, CURRICULUM, *EDUCATION, MEDICAL, FACULTY, MEDICAL/ MANPOWER, *SCHOOLS, MEDICAL, TEACHING, *TRAINING SUPPORT, UNITED STATES (1), VIETNAM (1)

(ANONYMOUS)
RESIDENCIES AND FELLOWSHIPS.
J PEDIAT 75:534-73, SEP 69
*INTERNSHIP AND RESIDENCY, *PEDIATRICS, *TRAINING SUPPORT, UNITED STATES (1)

(ANONYMOUS)
OTTAWA, TOO, MUST SHARE...
J CANAD DENT ASS 34:515-6, OCT 68
CANADA (1), *EDUCATION, DENTAL, *FINANCING, GOVERNMENT, HUMAN (4), *TRAINING SUPPORT

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(ANONYMOUS)
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J DENT EDUC 32:10, MAR 68
*EDUCATION, DENTAL, HUMAN (4), *TRAINING SUPPORT, UNITED STATES (1)

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J CANAD DENT ASS 33:533-6, OCT 67
CANADA (1), DENTISTS/ SUPPLY & DISTRIBUTION, *EDUCATION, DENTAL, FACULTY, DENTAL, HUMAN (4), STUDENTS, DENTAL, *TRAINING SUPPORT

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NEW ZEAL DENT J 64:1-3, JAN 68
*FACULTY, DENTAL, HUMAN (4), NEW ZEALAND (1), *SCHOOLS, DENTAL, *TRAINING SUPPORT

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AMER J NURS 68:312-5, FEB 68
*EDUCATION, NURSING, *LEGISLATION, NURSING, *TRAINING SUPPORT, UNITED STATES (1)

(ANONYMOUS)
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NEW YORK J DENT 38:167, MAY 68
*EDUCATION, DENTAL, GRADUATE, *EPIDEMIOLOGY/ EDUCATION, HUMAN (4), *RESEARCH, *TRAINING SUPPORT

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GRADUATE TRAINING PROGRAMS SUPPORTED BY THE NATIONAL INSTITUTE OF DENTAL RESEARCH.
J AMER DENT ASS 76:1389-97, JUN 68
*EDUCATION, DENTAL, GRADUATE, HUMAN (4), *RESEARCH SUPPORT, *TRAINING SUPPORT, *UNITED STATES NATIONAL INSTITUTES OF HEALTH

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KELLOGG GRANT TO PROVIDE SCHOLARSHIPS FOR NEGROES.
J AMER DENT ASS 76:1300, JUN 68
*EDUCATION, DENTAL, *FOUNDATIONS, HUMAN (4), *NEGROES, *TRAINING SUPPORT, UNITED STATES (1)

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MICH MED 66:1571-2, DEC 67
*EDUCATION, MEDICAL, *FINANCING, ORGANIZED, *PHYSICIANS/ SUPPLY & DISTRIBUTION, UNITED STATES (1)

(ANONYMOUS)
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J A M D A ASS 76:902-3, MAY 68
*AMERICAN DENTAL ASSOCIATION, DENTAL HYGIENISTS, *EDUCATION, DENTAL, FACULTY, DENTAL, HUMAN (4), STUDENTS, DENTAL, *TRAINING SUPPORT, UNITED STATES (1)

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JOSEPH GOLDBERGER FELLOWSHIP GRANTS FOR RESEARCH IN CLINICAL NUTRITION.
JAMA 203:507, 12 FEB 68
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A GOOD START.
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*ECONOMICS, NURSING, *EDUCATION, NURSING, *FACULTY, NURSING, GREAT BRITAIN (1)

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